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## NEWS

# DB2 extends specs

*Product manager clarifies referential integrity*

BY CHARLES BARBOCK  
CW STAFF

ARLINGTON, Va. — The next release of DB2 will extend support for the referential integrity requirements of the relational model and include features suited for production use, IBM's DB2 product manager said last week.

Mainframe production conditions create circumstances, such as recovery from system failure, that require data integrity even though they are not necessarily covered by the conditions of the model. "If a dozen tables are interrelated, it's important that they don't get out of sync as you store or recover one of them," said Gary J. Ferdinand, IBM's DB2 product manager in Santa Teresa, Calif.

In another example, a DB2 development spokesman at the same site noted that a partition of a DB2 table might not fit the referential integrity restrictions that the full table does. If its integrity is called into question, DB2 should have a reporting mechanism to note why integrity cannot be guaranteed and perhaps a method of reassessing the rules over the partition, the spokesman said.

## Fact or fiction?

Ferdinand did not specify that referential integrity will be part of the next release of DB2, which is expected to be announced by early May, but he spoke of implementing referential integrity almost as an accomplished fact.

"We've taken quite a while to do this.... It is, I think, going to be a complete piece of work," Ferdinand told his audience at an Arlington conference last week on computer-aided software engineering and relational data base sponsored by consulting firm Aramco Computer Assistance.

Ferdinand specified that referential integrity will mean the

data base administrator will be able to define foreign and null keys and have them enforced by the data base manager, rather than leaving them to be inserted by the application programmer.

Other areas of improvement in future releases cited by Ferdinand included:

- Query optimization. The optimizer, through its ability to follow rules for accessing data and digest accessing patterns, chooses the path a query will take to retrieve data. "There's no reason the DB2 optimizer can't read more statistics," Ferdinand said.

- Performance monitoring. The current monitor provides batch monitoring, and customers want on-line performance information.

- Index use. Today, DB2 can use only one index with an SQL command. If two indexes were available, it should be able to use both.

Ferdinand said development is carrying DB2 in the direction of working with multiple processing units, such as the six processors in the IBM 3090 Model 600E. Ferdinand replaced Marilyn Bohr as DB2 product manager in August.

Paul Hessinger, chief technical officer at the Computer Task Group, Inc. in Buffalo, N.Y., predicted that under IBM's ESA operating system, DB2 will be able to make use of large multiple buffers, each fitted to its own processing unit. He said such an innovation will multiply transaction throughput but is unlikely to appear for two years.

Shaku Atre, a Rye, N.Y., consultant and organizer of the conference, predicted that IBM will give DB2 users the option of storing special data handling instructions in hyperspace, a piece of expanded storage reserved under ESA to serve as a small part of a direct-access storage device inside the processor.

# CW brings home top press award

The Computer Press Association last week named *Computerworld* "best computer newspaper" and one of *Computerworld's* 1987 stories one of the "best news stories" of the year. In a computer publication as the organization presented its annual Computer Press Awards.

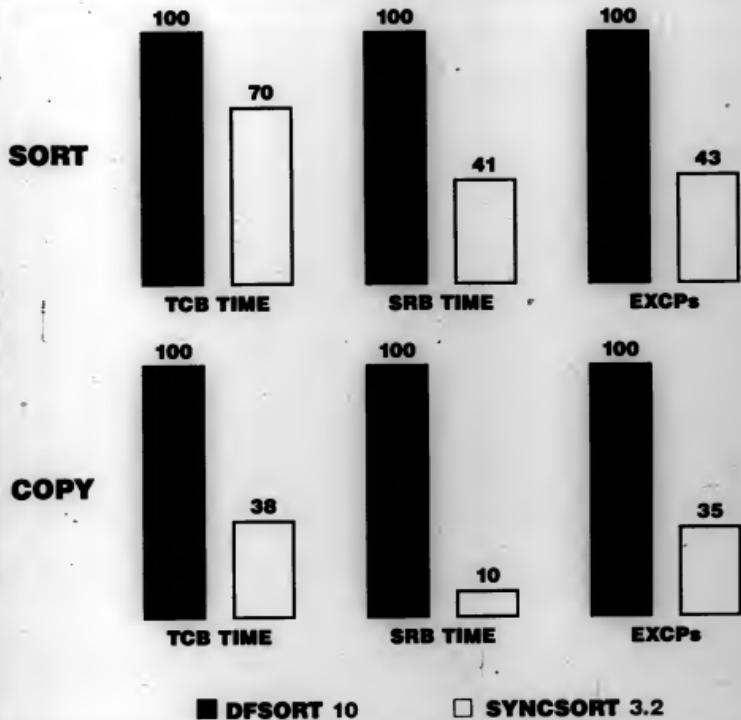
The third annual competition attracted more than 700 entries, including more than 70 publica-

tions, vying for awards in 15 categories that covered newspapers, magazines, books, newsletters, articles and broadcast programs.

Runners-up in the best computer newspaper category were *Government Computer News* and *Computer & Software News*. The Judge for the category was *Businessweek* editor Geoff Lewis.

Compuworld senior writers David A. Johnson and Alan J. Ryan shared runner-up honors for best news story in a computer publication for their May 18, 1987 article on the decline of the National Computer Conference. "It's the worst of times for NCC,"

# SYNCSORT 3.2 VS. DFSORT 10



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# Good news for IBM; slow times for DEC

BY CLINTON WILDER  
OF STAFF

Reflecting reinvigorated mainframe demand and a sudden slowdown in minicomputer sales, IBM's first-quarter performance outshone rival Digital Equipment Corp.'s for the first time in more than three years.

In financial results announced last week, IBM met or exceeded analysts' expectations with a 16% gain in profits on a solid 10% revenue increase. DEC's earnings fell 0.8%, the first glitch in its favorable growth curve since September 1985. DEC reported a 17% rise in sales.

Although DEC had warned earlier that its profits would not meet year-earlier levels [CW, March 21], its drop contrasted sharply with the earnings growth of IBM and the second largest mainframe vendor, Unisys Corp. That firm, continuing to reap the fiscal harvest from its consolidation of Burroughs Corp. and Sperry Corp., saw its earnings grow 35%.

"The mainframe business is hanging in there," said First Boston Corp. analyst Steven Miliosovich. "The mainframe's new role as a communications network manager and data base manager are at least offsetting its lesser use as an applications processor. People still need more mainframe power."

#### Best goals since 1985

IBM notched its third straight quarter of increased earnings after five consecutive down periods. Excepting the fourth quarter of 1987, when a lower tax rate, favorable foreign currency translations and the sale of Intel Corp. stock gave profits an abnormal boost, the 16% earnings growth was IBM's best year-to-year gain since the fourth quarter of 1985.

The stock market's reaction confirmed IBM's positive mo-

mentum as the firm's stock jumped 2% points last Wednesday, closing at \$116.40. Although DEC announced its results after the market closed Wednesday, its stock plunged 5% points to \$104.75 Thursday amidst the marketwide sell-off spurred by the

\$7.43 billion, while software sales continued to boom, rising 22% to \$1.71 billion. Revenue from minicomputers, continuing to reflect IBM's 1987 price cuts, declined 4% to \$7.87 billion.

Earnings were \$913 million, or \$1.53 per share, compared with \$785 million, or \$1.30 per share, in the first quarter of 1987.

#### VAX growth sags

The results from Maynard, Mass.-based DEC confirmed what the firm said last month—

#### On track

*IBM reverses slide with third consecutive quarter of earnings growth*



trade deficit (see story page 135). IBM was only slightly more fortunate, losing 4% profits, closing at 111%.<sup>1</sup>

Analysts said strong sales of high-margin 3090 mainframes and 3380 disk drives sparked IBM's growth, which was aided by the company's expense reductions of the past two years. The 10% revenue growth was paced by expense growth of 9.2%, and after-tax profit margin rose from 7.4% to 7.5%.

The February announcement of MVS/ESA was the key to unlocking demand for IBM's most popular mainframes, said Peter Labo of Dressel Burman Lambert, Inc. "It calmed the fears of people afraid to buy a machine that would be an orphan six months later," he said. "Customers didn't know if a 3090E would fit in the new environment or not."

Total first-quarter revenue rose from \$10.66 billion one year earlier to \$11.75 billion. Hardware sales grew 14% to

that its robust sales came from lower margin workstation products, while high-end VAX system growth was disappointing. The booming workstation market was in strong evidence last week, both Sun Microsystems, Inc. and Apollo Computer, Inc. reported outstanding quarters (see story below).

For its third fiscal quarter, DEC reported earnings of \$305.1 million, down slightly from \$307.6 million a year earlier. Per-share income rose from \$2.29 to \$2.33, reflecting a larger number of shares outstanding.

Revenue rose 17% to \$2.82 billion from \$2.41 billion, but analysts said DEC needed a 20% sales growth to hit its targets.

The balance of the year will determine whether the quarter was an aberration or the beginning of tough times for DEC and other minicomputer vendors victimized by price/competition competition from workstations and local-area network-linked personal computers.

## Business booms for Sun, Apollo

The engineering workstation market has continued to flourish despite a shortage of memory chips. Both Sun Microsystems, Inc. and Apollo Computer, Inc. reported strong quarters last week.

"Business is booming, particularly at the low end," said Michael Orsak, industry analyst at Robertson, Colman & Stevens. "I don't think it has peaked. Demand is growing."

For the third quarter ended March 25, Sun reported net in-

come of \$14.3 million, or 39 cents per share, on net revenue of \$259.7 million. In comparison, the company posted net income of \$10.2 million, or 29 cents per share, on net revenue of \$143.3 million for the corresponding quarter last year.

For the first nine months of fiscal 1988, Sun's net income was \$41.2 million, or \$1.13 per share, on net revenue of \$466.5 million. That compares with net income of \$25.4 million, or 80 cents per share, on net revenue

of \$351.6 million for the same period in 1987. Sun officials said the rising prices for memory chips and a scarcity of these components related to lower profit margins than expected. However, they said such activity is not expected to impact growth in succeeding quarters.

Apollo posted net income of \$10.4 million, or 29 cents per share, on net sales of \$168.9 million for its first quarter ended April 2.

JULIE PITTA

COMPUTERWORLD

## VAX series

FROM PAGE 1

source close to the company indicated.

An East Coast user said such a feature would be attractive to workstation users on a local-area network because it would allow them to access applications and disk storage and share files with users on a Cluster Interconnect-based cluster.

#### Gradual process

Wides predicted DEC will not immediately begin to phase out the older VAX processors overlapped by Calypso. He said, however, that gradual replacement can be expected. DEC also continues to offer models overlaid by the 8800 series.

"If you are a new buyer, you would not buy the old line," Wides said. But he added that in some cases, such as scientific applications, a VAX uniprocessor could deliver more efficient performance than a comparable VAX symmetrical multiprocessor. This is because of the additional power used by the operating system to make four processors work together.

Commercial users will find

**I**N SOME cases, a VAX uniprocessor could deliver more efficient performance than a comparable VAX symmetrical multiprocessor.

the symmetrical multiprocessors better suited than a uniprocessor to transaction processing applications, Wides predicted.

Wides said he believes the models will be priced from approximately \$200,000 to \$450,000. "It sounds like they're going to price it relatively high," he said.

A base model of the Microvax 3500 contains the same CPU as a Calypso 6210 model. It is priced at \$74,000, a VAX 8350, capable of 2.4 MIPS, carries a base price of \$124,000; and a base model of the VAX 8700, featuring 6 MIPS, is priced at \$454,000.

Such prices tend to indicate the DEC does not plan to replace its existing models but will, rather, offer them to users who prefer a uniprocessor to a multiprocessor, Wides said.

The Calypso series will also include a new memory board called the XMI bus, Wides added, that runs at 100M bytes/sec, compared with the 60M bytes/sec NMJ bus used on the VAX 8800 series. Wides said this fact fuels his belief that the 8800 series may be enhanced before long to include the faster bus.

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# NET set to purchase Excelan

*Merger to provide enterprise-wide connectivity*

BY PATRICIA KEEFE  
CW STAFF

**REDWOOD CITY, Calif.** — Positioning itself as a one-stop source for enterprise-wide networking, Network Equipment Technologies, Inc. (NET) announced plans last week to purchase Excelan, Inc., which will become a wholly owned subsidiary.

NET is a supplier of wide-area networking, T1 and network management products. Excelan builds local-area networks based around Ethernet and Transmission Control Protocol/Internet Protocol. With no overlap between product lines, analysts lauded the surprise merger as a good fit.

The merger reflects a continuing trend in the communications industry toward consolidation. Companies specializing in only one type of network technology face a significant impediment to growth, explained Andy Shopick, an analyst with Gartner Securities Corp.

"Today, there are only two high-growth communications markets — wide-area networks and LANs — and we [will] have a foot in each," NET President Bruce Smith said. But he quickly added that the lines between the two markets are fast becoming blurred.

Under the terms of the agreement, which is subject to stockholder approval, Excelan shareholders will receive two-thirds of a share of NET common stock

for every share of Excelan common stock currently held. The merger is expected to be finalized by June.

No layoffs are planned. However, Excelan said President and Chief Operating Officer C. Richard Moore had resigned from the company to pursue other interests. Kawail Rekhi, Moore's successor, denied rumors of political infighting at Excelan.

After the merger is completed, Rekhi will continue to head up the subsidiary but will also become a NET senior vice-president and join NET's board of directors.

Smith will continue as president and chief executive officer of NET.

Principals and analysts cited the merger as an offensive move by NET to advance into the LAN market. Profitable and with little or no debt, the companies individually are experiencing growth rates of 70% to 80%.

#### Getting serious

Excellan and NET "have talked off and on for a long time, but the serious discussion took about a month," Rekhi said.

Although the merger's impact on customers is unlikely to be felt before 1989, the most important benefit will be the ability to interface between the LAN and wide-area network markets across standards. Principals said a closer linking of

the two markets will also simplify maintenance and support issues. Merging the product lines will also include extending NET's network management to LANs.

Joint product development will focus initially on gateways and routers between the two environments, according to Excelan's Rekhi.

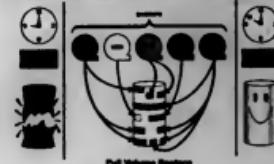
NET's effort to round out its technology portfolio and extend its reach throughout the corporation may strengthen it as a competitor to IBM, with which NET has a distribution agreement. IBM sells and services several NET T1 multiplexers under an agreement executed in June 1987. That pact also calls for IBM to contribute some funding toward development of future NET products.

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# Wary users unconvinced about Unix

BY JULIE PITTA  
CW STAFF

While corporate users may be less likely to dismiss Unix than they were before last week's commitments from Lotus Development Corp. and Ashton-Tate Corp., they are not likely to jump onto the Unix bandwagon any-time soon.

"The fact that a company is willing to endorse something doesn't give me a warm feeling," said Michael Cromar, information resources director at American President Companies Ltd., a \$2 billion shipping firm based in Oakland, Calif. "It was until they deliver something. Until then, we'll keep buying the way we've been buying."

A lack of mainstream applications for desktop computing, coupled with Unix's complexity, have continued to discourage that environment's acceptance beyond the engineering departments of most large corporations. To give Unix a more user-friendly demeanor, San Microsystems, Inc. has licensed Xerox Corp.'s graphical user interface to be included in Sun and AT&T's Unix System V, Release 4 (see story page 1).

However, the release will not be ready until mid-1989, and no firm schedules as yet exist for a Unix version of Lotus' 1-2-3 and Ashton-Tate's DBase III Plus. Nonetheless, Sun Vice-President of Research and Development William Joy claimed that Lotus has already ported 1-

2-3 to Unix. And critics like Hewlett-Packard Co. and Digital Equipment Corp., which have said that Sun will enjoy an unfair advantage, are likely to continue to oppose the alliance and push their own versions of Unix.

## Choices and confusion

As a result, corporate users may be more confused than ever. "When we had fewer options, the choices were easier," said David Malmberg, director of strategic planning and new technology at McKesson Corp., in San Francisco. "More choices add confusion."

Users pointed to portability as Unix's primary advantage. "Unix is the only operating system able to run on a wide range of systems, from the smallest desktop to the largest mainframe," said Bill Anderson, senior vice-president of new technology at Seafirst Bank, a Seafirst Corp. division in Seattle. "The more people that embrace Unix, the better it will be."

However, Seafirst will not standardize on Unix because that would require a massive investment in new equipment, Anderson said.

The investment required will likely dissuade American Presidents from converting to Unix, Cromar said, although he said he is a proponent of a single operating system spanning a range of hardware. "Unix looks like the best hope for a single operating system [but] in the sense that users have invested in other platforms, it's difficult."

Not all see Unix as a viable alternative in mainstream computing environments.

"It's had enough with OS/2, DOS and the Mac," said Jeff Ehrlich, manager of information technology at General Electric Co. "The last thing on earth that I need is something else."

# Ingres prepped for OLTP race

BY NELL MARGOLIS  
CW STAFF

ALAMEDA, Calif. — Relational Technology Inc. clocked in last week with claims of a dramatic speed increase and a multiserver architecture for its Ingres relational database management system. The announcements continue the escalating race by

various scalable, or linear, performance in a multiprocessor environment. Ingres Release 6.0's multiserver architecture lets multiple copies of the data base engine, each on its own CPU, go against the same data base.

This configuration works best in a multiprocessor hardware environment like Digital Equipment Corp.'s Vaxcluster or Po-

can be assigned different tasks; for instance, high-priority applications can be run on a faster node. Since fewer processes are running at any given time, the CPU is less taxed.

## Speeding bullet

To further fit Ingres for OLTP, Relational Technology included fully automated recovery techniques and an advanced journaling system. An enhanced version of Ingres's artificially intelligent query optimizer adds significantly to the performance of Release 6.0, according to Healy.

Moreover, to illustrate Ingres 6.0's potential for transaction processing, Relational Technology announced that its internal speed improvement project, code-named "Silver Bullet," has resulted in a significantly faster Ingres. Tests run on a hybrid of Ingres Release 5.0/0.95 and Release 6.0, using the ET1 debit/credit benchmark, showed a speed of 54 transaction/sec.

In a report on the future of transaction processing published last year, The Yankee Group, based in Boston, cited several ET1 benchmark results: IBM's DB2, running on an IBM 3090 Model 200, notched 40 transaction/sec.

In a Vaxcluster, new nodes can be added to the cluster without a proportional increase in performance because of the bottleneck that results when the lone server has to process irre-creased data base queries.

Multiserver architecture, on the other hand, lets the data base administrator balance the load. Different servers, Healy said,

INFORMATION PROVIDED BY RELATIONAL TECHNOLOGY, INC.

DBMS makers in the on-line transaction processing (OLTP) market.

Ingres Release 6.0, which began shipping late last month, is targeted at large users running the high-volume, speed-intensive applications typified by airline reservation or stock market monitoring software packages. It was substantially re-engineered for multiprocessing hardware platforms.

The result, according to Robert Healy, Relational Technology's marketing vice-president, is a relational DBMS that pro-

mises to let Star multiprocessor models, Healy said, because in a single-server data base architecture, front-end programs write SQL statements to a data base server that responds to all calls.

In a Vaxcluster, new nodes can be added to the cluster without a proportional increase in performance because of the bottleneck that results when the lone server has to process irre-creased data base queries.

Multiserver architecture, on the other hand, lets the data base administrator balance the load. Different servers, Healy said,

RELEASE 6.0 IS AVAILABLE AS AN UPGRADE OR AT AN INITIAL LICENSE FEE RANGING FROM \$5,000 TO \$160,000.

# Soap opera

FROM PAGE 1

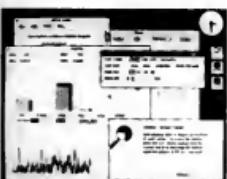
Open Look that span a period lasting from this summer to next year. They also won key endorsements from microcomputer heavyweights Lotus Development Corp. and Ashton-Tate Corp., as well as mild support from other companies.

All of these elements indicate that Unix and Open Look have a real shot at the desktop market.

"It's all futures, but I think this makes Unix on-the-desktop credible," said Molly Upton, manager of integrated business systems at International Data Corp. in Framingham, Mass.

Other industry analysts agreed. "There is more than one kind of user, so there's a place for more than one user interface," said Brian Boyle, an analyst with Norwest Research Corp.

That, however, is the simple story. Before the desktop mar-



Open Look graphical user interface: It's on the way.

ket reaches the point at which it has three legitimate alternatives, the soap opera aspect needs to play itself out.

Future is a scene similar to a cliff-hanger episode of *Dallas*. Who will win? According to Microsoft Corp. and its own co-development deal with AT&T? Who will cast aside AT&T in favor of Sun? What will IBM do? What about the so-called Hamilton

Group, a collection of Unix vendors that recently opposed the initial Sun and AT&T alliance? Will it embrace Open Look or find another interface? And what impact will the messy lawsuit brought by Apple against Microsoft and Hewlett-Packard Co. have on Open Look?

Based on interviews with the companies and industry analysts, this is the way the drama shapes up:

- Microsoft. The company was noticeably absent from the AT&T press conference last week. There are indications that Microsoft was unsuccessful in convincing AT&T to port an interface based on Microsoft's Presentation Manager to Unix. When asked if it had been rejected by AT&T, Adrian King,

Microsoft marketing manager of operating systems, said, "I'm sure we talked to them about Presentation Manager, and, in a sense, it could be seen as a lost sale."

Industry speculation is that Microsoft will go ahead without AT&T and introduce a Unix user interface.

- IBM. Placed in an awkward position by last week's events, IBM is saying nothing. The company has simultaneously become the great promoter of Presentation Manager for the OS/2 environment and a self-proclaimed Unix devotee.

- "I don't think they'll support Open Look because they really want Presentation Manager to be the one of choice," said Jeff Silverstein, publisher of "Software Industry Bulletin."

- The Hamilton Group. Fate unknown. The group of vendors active in the Unix market was unable to put forth a united front last week. Digital Equipment

Corp. is taking a tough-guy approach, claiming that its DEC Windows interface, now in beta testing, is better than Open Look.

However, Apollo Computer Inc., another Hamilton Group member, expressed concern that it had not been included in the AT&T Open Look effort. "We're frustrated," said Mark Hatch, Apollo's manager of portable software products. "Despite AT&T's apparent acknowledgement of our concerns, here is an example of Sun getting things ahead of time."

- The Apple lawsuit against Microsoft and HP. While a cloud of doubt hangs over Presentation Manager and HP New Wave, AT&T and Sun have skirted the problem through an agreement in which Sun licensed Xerox's graphical interface for use in Open Look. AT&T can now appeal to users with the idea that its product is safe from litigation.

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# Presentation Manager wave still out at sea

BY DOUGLAS BARNEY  
and ED SCANVELL  
OF STAFF

The OS/2 Presentation Manager may well be the wave of the future, but MIS managers need not break out their surfboards anytime soon.

Despite optimistic reports, most Microsoft Corp. OS/2 graphical applications will not ship on the heels of the Presentation Manager, and some may not emerge for many months or even years after that product's release.

The wave lies in the dramatically more complex environment of Presentation Manager, which requires that applications be written with bit-mapped graphics, menus, windows and more esoteric features.

While a raft of applications vendors have promised Presentation Manager-based applications, none, including Microsoft itself, have announced delivery schedules.

Few are daring to say more than that their applications will be delivered "soon after" the Presentation Manager. Some, most notably the ambitious Borland International, are promising a wait of less than six months after the interface ships.

Although most ship dates have yet to be shored up, one thing is clear: it is going to take much longer for these packages to hit the shelves than many users believe.

Knowledgeable graphics programmers caution that there will probably be no more than a dozen simple applications delivered by the end of the year, and it will be mid-1986 before a sizable number appear on the market. All of this promises that IBM and Microsoft will deliver Presentation Manager by Halloween, a date that many developers have begun to doubt.

Unlike programming models in the DOS world, designing graphically oriented software requires a firm understanding of esoteric concepts like dynamic-link libraries and interprocess communications. This sort of learning curve could tack years onto some software development projects.

"If you build a product from the ground up, it is a few years of work," said Arun Gupta, chief executive officer of Dataspace International, Inc. "If you take a product like our [Dataspace DBMS], which is already menu-and-forms-oriented, and do full justice to the Presentation Manager, it is a little over a year."

As a result of its early work with Microsoft Windows, Gupta

said he expects Dataspace to release a product some three months after the shipment of the Presentation Manager.

But given that most vendors have little experience in the complex world of bit-mapped graphics, the year or more wait may be par for the course.

**No flood until 1990**  
"You will start seeing Presentation Manager applications coming out in 1986, but you won't see the floodgates open until late 1989 and 1990," said Umasing Gupta, chairman of Gupta Technologies, Inc.

In fact, even relatively simple monographics-mode applications have been plagued by major delays as features are added. A graphical user interface puts a larger burden onto developers and thus, stretches out development time. As a result of the added complexity, Microsoft, Inc. Chairman Wayne Erickson said he simply does not know how long it will take to develop for the Presentation Manager because his firm has never developed that kind of software.

In addition to learning to work in a graphical environment, many developers have had to switch from programming in assembler to coding in C.

**A precedent in history**  
According to a source close to Microsoft, it could take a year or more for vendors to develop for the still unshipped graphical user interface. In fact, it took Microsoft some two years to move Excel from the already graphical Apple Computer, Inc. Macintosh environment to Windows.

Although a few key firms have been working with prelease Presentation Manager code, most have not gained a head start. While some product design and conceptualization has taken place, the developers tools, which include a beta-test version of the interface, just recently began to ship.

Even porting Windows applications to the Presentation Manager promises to be a time-consuming chore, because of a lack of conversion tools.

Despite the lack of tools, applications currently working under Windows are the most likely candidates to be ported first. Presentation Manager is based, at least in part, on the fledgling Windows interface.

"People [with Windows applications] who start right away should be able to have a port within the first half of next year. If anyone ships in 1986, it will be on December 31," said Paul Grayson, chairman of Micrografx, Inc. in Richardson, Texas.

# Dbase IV delivery doubts persist

BY STEPHEN JONES  
OF STAFF

Ashton-Tate should have seen it coming.

Although the shipping deadline for Ashton-Tate Corp.'s long-awaited Dbase IV is still about four months away, there is already speculation that the data base program is going to be late. Concerns have been fueled by reports from early users that their versions of Dbase IV code is

phantom," said Liam Egan, director of end-user computing at the Financial Services Group of Dean Witter Reynolds, Inc.

Nevertheless, Ashton-Tate is sticking to its guns. Development managers at Ashton-Tate compared notes on Dbase IV's progress last week and concluded that they foresee no serious delays for the product, a company representative said.

One consultant stressed that it is too early to judge the Dbase

cause it is not capable of supporting application development.

It is also difficult to judge the program's overall effectiveness because its separate components do not work together as one integrated package. One analyst who has worked with the Dbase IV code said that such important elements as the package's SQL language, application generator and report writer are not connected and crash the system when run together.

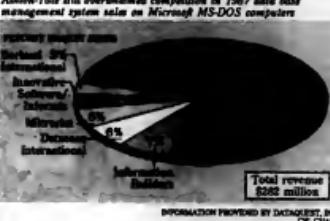
Some sources close to the product's development question whether all its components will be folded together in time to meet the delivery deadline.

## Design flaws?

Potentially more troubling for Ashton-Tate are shortcomings related to the basic design of Dbase IV. Some analysts said they believe the need to stay tied to the old Dbase language will drag down the potential of Dbase IV's SQL implementation. "One of the drawbacks of Dbase IV is that they had to scale it back to maintain the backward compatibility," said Adam Green, a data base consultant and author.

One of the biggest pitfalls of the system, observers said, is that Dbase is a procedural language and, therefore, requires that users manipulate downloaded data from a remote source on a record-by-record basis.

Ashton-Tate opted to keep the record-processing approach in order to provide a migration path for the approximately two million users currently working with applications written in earlier procedural Dbase languages. As a result, Dbase IV is split into halves — one based on next-generation SQL technology and the other on a remnant of an aging language.



"raw" and bug-ridden.

But observers said the company brought the criticism upon itself by presuming the Dbase III Plus upgrade far in advance of its ship date. Driven by growing competition and the need to hold onto an upgrade-hungry installed base, Ashton-Tate announced the product six months early, in February, against its self-proclaimed goal of not announcing products until they are ready to ship.

Now, the Torrance, Calif., developer is feeling the pressure to deliver on its promises by July 31. "Until it ships, Dbase IV is a

code, since it is still in early alpha-test form and prone to crashes. "They have four months to develop Dbase IV. Four months is not a whole lot of time, but it's enough," said Richard Fleishstein, a senior consultant with the Codd and Date Consulting Group in Chicago.

Yet nagging questions persist about whether Ashton-Tate developers will be able to pull the 400,000 lines of Dbase IV code together by the July deadline. Sources familiar with the development project said Dbase IV has not been sent to Ashton-Tate's top corporate clients be-

# Ashton-Tate looks to minis

*Partnership to yield Dbase for OS/2, Unix, VMS*

BY STEPHEN JONES  
OF STAFF

**TORRANCE, Calif.** — Ashton-Tate Corp. clinched a course for future Dbase development last week by teaming up to jointly develop IBM OS/2 Presentation Manager, Unix and Digital Equipment Corp. VMS versions of its data base management system with Interbase Software Corp.

Ashton-Tate will build Dbase products around Interbase's transaction-oriented SQL engine [CW, March 21]. Interbase developers will team up with Ashton-Tate to rework the former's minicomputer and high-end workstation-based relational technology and embed

components of the code into new Dbase packages.

The first application from the joint development agreement will be a Presentation Manager version of Dbase/VMS, informally known as Dbase V or Dbase PM, which Ashton-Tate said will ship within six months of the Presentation Manager's expected release this October, company officials said.

In addition to licensing the Interbase technology, Ashton-Tate took an unstructured equity position in the Tysons, Va.-based company. Ashton-Tate reportedly will share ownership of the jointly developed technology but will receive exclusive marketing rights to any related products.

Analysts have recently said the partnership will give Ashton-Tate a much-needed technological boost as it takes on all comers in the high-end relational DBMS market.

The market was wondering how Ashton-Tate was going to respond to competition from the mid-range developers, but this shows that the company is making the right moves to stay on top," said Randy Sutherland, an analyst at Dataspace, Inc. in San Jose, Calif.

By coming up to Interbase, Ashton-Tate is expected to get a crack at distributed data base processing across a variety of operating systems, including such as Unix and DEC's VMS. The Interbase DBMS currently provides access and processing over networks on mid-range systems from DEC, Apollo Computer, Inc. and Sun Microsystems, Inc.

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## Tandem LAN to support OS/2

BY KATHY CHIN LEONG  
CW STAFF

**NEW YORK** — In the first announcement since their February agreement to merge, Tandem Computers, Inc. and Ungermann-Bass, Inc. last week revealed separate plans to support Microsoft's OS/2 and LAN Manager. The companies made their introductions here together.

Although the product plans do not reflect any joint development between the companies, Tandem officials said the announcement underscores a unified consensus that both firms are working toward pursuing the new market of desktop

on-line transaction processing (OLTP).

Tandem officials said OLTP users are looking for additional horsepower at the workstation level. Tandem's HPC considers bringing OLTP features to the personal computer level via local-area networks and more. "The verification can be a true plus in OLTP," Tandem product manager Jerry Edwards said.

During the product introduction, Tandem said it will license MS OS/2 from Microsoft Corp., and resell the operating system to customers with Tandem PCs. The company revealed that its Multilink, which links other vendors' networks to Tandem hosts, will support OS/2-based worksta-

tions and LAN Manager-based networks.

The firm will initially support networks from Ungermann-Bass. By September, Tandem said, it will certify other vendors' networks for Multilink interoperability.

Tandem also said it will port its existing Microsoft MS-DOS applications to OS/2 for Multilink workstations. The first product stated, for conversion is the PC6530 terminal emulation and file transfer package, set to be available late this summer.

Ungermann-Bass said it has licensed the LAN Manager from Microsoft. By the third quarter, the company plans to sell its Net/One Universal Workstation bundled with the LAN Manager. Pricing has not been set.

## LAN Manager

CONTINUED FROM PAGE 1

Manager applications programming interface, Named Pipes and Mail Sockets.

Yet Microsoft has by no means locked up the OS/2 connectivity market. Industry observers said they see a three-way horse race for LAN market share and split the remainder between Novell and whatever others. The access method will be supported by IBM's forthcoming OS/2 Extended Edition.

What remains unclear is whether users will be able to mix and match pieces of all three currently unshipped products.

Thomas White, president of Infotek, Inc., a consultancy in San Jose, Calif., said he expects the LAN Manager to open the LAN market to a greater number of competitors, possibly leading to price wars that could undermine software support.

**Too big to ignore**  
As a result, several industry observers said they expect IBM will be forced to formally announce support for Named Pipes and Mail Sockets under its LAN Server. "IBM can't ignore all these announcements," said Cecilia Brancato, an analyst with Ovum Research & Co.

An IBM acknowledgement would ease concerns of users who fear being locked out of OS/2 Extended Edition and the IBM environment if they opt for third-party network products.

The bulk of LAN Manager support came from 29 hardware OEMs that announced plans to license the OS/2 server program or a Microsoft development service held in New York last week.

Those licenses included such industry heavyweights as AT&T, Convergent Technologies, Inc., NCR Corp., NEC Corp., Network Computer AG, Inc., Olivetti & Co., Siemens AG, Micom Systems, Inc., Tandem Computers, Inc., Tandy Corp., Retix, Toshiba Corp., Televideo Systems, Inc., Western Digital Corp., Standard Microsystems Corp. and many licensees of the LAN Manager processor, MS-NET.

The prevailing theme underlying this support was twofold: pressure from customers seeking direction and Microsoft's insistence of being able to mix and match products.

These announcements fall into two groups: those from hardware vendors that will ensure their products are compatible with LAN Manager, and those from networking product and software vendors that are building programs around a LAN Manager core.

This grassroots of support crowding the LAN Manager marketplace follows similar, earlier announcements from 3Com, Hewlett-Packard Co., Digital Communications Associates, Inc., Encore, Inc. and Teris Systems, Inc.

Another five PC vendors did not license LAN Manager but said they would support it. They included Compaq Computer Corp., Apollo Computer, Inc., Tandon Computer Corp., Wyse Technology and Zenith Data Systems.

Despite the rush to embrace the LAN Manager, few licensees have revealed availability dates for their versions of that software. Products with announced ship dates include 3Com's 3+ Open network operating system, in June; NCR's product line, May 19; and Teris Systems' Tapex II, in the third quarter.

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## DEC tailors suit for Clearpoint

BY NELL MARGOLIS  
CWT

BOSTON — Digital Equipment Corp. picked up the legal cudgel once more and hit Hopkinton, Mass.-based Clearpoint, Inc., with a lawsuit alleging multiple counts of copyright, patent and trademark infringements last week.

"This should be good for our business," said Clearpoint Vice-President John Stadler. "Getting sued by DEC is a sign of arrival in the DEC market."

The legal action, containing three main thrusts involving DEC's proprietary VAXBI technology, was filed last week in the U.S. District Court for the District of Massachusetts.

DEC contends that Clearpoint's VRAM memory product infringes on three DEC patents. Further, DEC charges Clearpoint with infringing on its copyright on the VMS operating system. DEC is seeking an injunction and monetary damages on both the copyright and patent claims. Finally, according to the

complaint, Clearpoint is violating a series of DEC trademarks, including those of the VAX and MicroVAX.

Clearpoint's Stadler pointed out that DEC obtained trademark protection for its acronyms only two months ago — long af-

ter Clearpoint allegedly copied or imitated them.

"That has no legal relevance whatever," a DEC spokesman retorted. "Infringement is infringement."

While the battle has been joined, Stadler suggested that

Clearpoint is not the only company DEC is fighting. "Cynically, I find it hard to believe that this isn't just DEC trying to scare a lot of people," he said. None of the actions cited in the complaint are recent, he pointed out. What is recent, however, is that at least two other companies have been talking about coming out with VAXBI products. This looks like a pre-emptive strike

on DEC's part," he said.

During the past year, DEC has reached out-of-court settlements on two other infringement actions — one against Systems Industries, Inc., and one against Emulex Corp. Under the terms of the settlements, Systems Industries and Emulex each agreed to pay royalties to DEC for use of the contested technology.

## Symbolics goes software

CAMBRIDGE, Mass. — In a bold departure from the dedicated LISP workstation line for which it is known, Symbolics, Inc. last week introduced an expert systems shell with an embedded programming language.

*Joshua*, as the package is called, is the first step in Symbolics' redirection: it is a tool for building expert systems that can then be embedded in larger applications.

According to a spokesman, the value added — the basis on which Joshua can be differentiated from other expert systems development products on the market — is that Joshua is built on top of LISP as well as layered on Symbolics' Genera operating system.

Initially, Joshua will be available on all Symbolics hardware platforms. However, the company spokesman said Joshua-created applications are not locked into the Symbolics proprietary environment. Currently active networking capabilities, he said, will give users a link to IBM, Digital Equipment Corp. and most Unix-based computers. Moreover, board-level systems based on Symbolics' forthcoming Ivory chip, slated for fourth-quarter or earlier delivery, will support Joshua.

Scheduled for June availability, Joshua is expected to be priced at \$15,000 per CPU, or \$60,000 for a subnet license.



# How To Go Fa

# IBM tries to calm OS/2 developers

BY JEAN S. BOZMAN  
CW STAFF

CHICAGO — William Lowe, president of IBM's Entry Systems Division, promised last week that 1,000 applications for his firm's OS/2 operating system will be available by year's end.

IBM executives further worked to calm fears that the OS/2 Presentation Manager is behind schedule.

Lowe and William P. Lyons, IBM's Personal Systems Merchandising general manager, underlined a commitment to meet the July deadline for shipping

OS/2 Extended Edition 1.0 and the October target for the Presentation Manager.

Microsoft Corp. Chairman Bill Gates, who, along with the IBM executives, spoke at a seminar here, said developers have had some unexpected difficulties working with the Presentation

Manager tool kits. The problems might slow the delivery of full OS/2 applications.

"OS/2 has a better file system, and the way it buffers information is more efficient than MS-DOS," Gates said. "But it takes more machine cycles to put stuff up on the screen, and developers need to learn how to work with it."

Meanwhile, IBM hinted at fu-

ture enhancements of its Personal System/2 intended to make it more attractive to current minicomputer users.

Among the enhancements IBM predicted for the next two to three years are the following:

- Support for the REXX development language, now supported under the mainframe VM operating system.

- Support of up to three simultaneous ASCII communications sessions under the OS/2 Communications Manager.

- The addition of a Remote Data Services module to OS/2 Extended Edition to create distributed data bases across a company's nationwide communications network. Use of IBM DB2 relational data base management system concepts as well as automatic record-locking and data validation would be essential to ensure data integrity across the network, IBM said.

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## Sony promises first optical erasable drives

BY JEAN S. BOIZMAN  
CWT STAFF

CHICAGO — Sony Corporation of America last week said it plans to be the first company to sell erasable optical disk technology for end-user systems.

The company said in April 1987 announced plans to develop a 3½-in. erasable optical disk drive, said it intends to ship the first erasable drives to manufacturers in May.

The new erasable media "can be erased and written upon more than one million times," Sony Chairman Masaki Morita commented in a speech at the As-

sociation for Information and Image Management (AIIM) show, which was held here last week.

The 3½-in. optical disk will be encased in a plastic cartridge similar to those used for today's 3½-in. floppy disks. The 650M-byte disks are double-sided and achieve error rates of less than one error per trillion bytes through error-correction firmware, according to Sony.

The Sony drive, which includes a small computer system interface card in its controller, is said to be sold initially to computer vendors for \$7,000 per unit, with the erasable disks priced at more than \$200 each. Prices are expected to come

down once volume shipments begin in early 1989, Sony said. The company claimed burst data-transfer rates of 1.2M bytes/sec, and user data-transfer rates of 680K bytes/sec.

### Beating the competition

If Sony meets its target date, it will ship before Osaka, Japan-based Sharp Electronics Corp. can ship its 3½-in. erasable optical drive, said Bob Katsive, vice-president of DataTrend, Inc., a Mountain View, Calif., market research firm. Eastman Kodak Co.'s Verbatim Corp. subsidiary also plans to release a 3½-in. erasable drive this year.

However, Katsive added, "it probably won't be until 1990 that we see Sony or any other company ship quantities of 50,000 to 100,000 units of erasable optical disks."

The Sony disk technology works like this: Existing data is erased by a laser with a one-micron beam. Then a changeable magnetic field records new data on the optical disk by alternating its direction, according to Takeshi Yawata, assistant manager of Sony's Tokyo-based Optical Disk Drive Division.

Other highlights of the AIIM show included the following:

• Plessey Corp. in Costa Mesa, Calif., introduced a \$30,000 facsimile capability that it said allows its document storage and retrieval systems to send data, text and images to remote sites.

• ICI Electronics, a \$20 billion British conglomerate, introduced an optical storage media called digital paper. Digital paper was presented as an inexpensive alternative to optical disks. It relies on a polyester-based substrate covered by an infrared-sensitive coating. ICI claimed a storage capacity of 600G bytes on a 2,400-ft reel of ¼-in. tape.

## Kaypro lays off 40 employees

BY JAMES A. MARTIN  
CWT STAFF

SOLANA BEACH, Calif. — Faced with production problems and dynamic random-access memory chip shortages, Kaypro Corp. last week said it has laid off 40 employees across-the-board and is considering further staff reductions within the next few weeks.

The recent dynamic RAM price increases and shortages have reduced Kaypro's production and shipment levels. In addition, shipment of the Kaypro 2000 Plus laptop has been delayed for months because of "other component shortages," President David Kay said. He did not elaborate.

Kaypro has not managed to pull itself out of the bottom of the IBM Personal Computer-compatible market, analysts said, and it is therefore more vulnerable to losses from such demand and shortages.

The layoffs, coupled with Kaypro's recent announcement that it plans to be among the first to ship microcomputers compatible with the IBM Personal System/2 Micro Channel architecture (CW, Feb. 26), show that the company is trying to shake its bid-back image and become more aggressive, observers said.

"A former employee at Kaypro once commented to me that Kaypro very well," said Richard Shaffer, editor of "Technology Partners Computer Letter" in New York. "He said there were too many Kays and not enough pax," in reference to the Kay family that has run the company since its days as Non-Linear Systems, Inc., in the 1950s.

Kaypro originally stated it would begin shipping a Micro Channel-compatible system by late May. However, Kay said last week that the company has not decided which chip set it will use in the system and has pushed back shipment to the third quarter. No details were given on which PS/2 Micro Channel machine — Model 50, 60 or 80 — would be closest.



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## EDITORIAL

## Campaign agenda

**O**F THE FOUR presidential candidates who will slug it out in tomorrow's all-important New York primary, who is best equipped and positioned to lead our budding information society to full bloom?

In seeking some answers to this critical question, our investigation of the records of Bush, Dukakis, Gore and Jackson turned up some interesting findings (see story page 1). Although the four span the political spectrum from the moderate right to the relative left, the campaign rhetoric up to this point aligns each candidate with policies designed to fuel the U.S.'s burgeoning information business.

And that's really the problem. Because, as our report shows, one really needs to get beyond the rhetoric to begin to see just how much of this high-tech bluster is spoken from the heart and how much reflects pure political survival instinct.

Let's take Gov. Michael Dukakis. He's toned down the "Massachusetts Miracle" hype that saw him through the earlier primaries and is likely to keep it even more quiet as a result of recent reports that have skewed Dukakis's credit-taking for the success of the Bay State economy. In fact, many who remember Dukakis's first term as governor of Massachusetts will recall someone who was perceived by businessmen as anything but a friend of high-tech. Oh well, Mike, if chameleons can change, so can people.

Or how about Vice-President George Bush? He says he wants to be known as the "education president." That's all well and good, but how does he justify his No. 2 spot in the presidential administration that presided over the deepest cuts in history to education? The Japanese have leapt decisively ahead of us in technical education, and that's happened on your watch, George.

Jesse Jackson says his presidency would stem the flow of jobs from the U.S. to other nations, with a key plank in his platform being tighter regulation of key businesses like telecommunications. But somehow, tighter regulation of businesses coupled with a \$20 billion hike in corporate taxes doesn't really mesh with the concept of creating more information-age jobs. Jesse, this needs some work.

And then there's young Sen. Al Gore, the only computer user in the bunch. Perhaps more than any other candidate, Gore's record and campaign rhetoric come close to matching. But his candidacy will likely be history after the New York primary. Too little too late, Al.

As much as the candidates sound alike vis-a-vis information society policies, the ability of each to ram his plane through Congress will ultimately separate the wheat from the chaff.

And let's keep in mind what's not being addressed by any of the candidates, as the counsel for ADAPSO pointed out — the crucial issue of how society will be able to cope with a technology that is rapidly outpacing the ability of our institutions to accommodate it.



## LETTERS TO THE EDITOR

## Make no mistake

Contrary to the editorial titled "A bitter pill" [CW, Feb. 8], we — the Chicago Area VM Enthusiasts — would like to go on record as vociferous in our concern about the object-code only policy, lest anyone else mistakenly perceive that our potential fury is quelled because IBM has been quick to respond to specific user problems.

Gregory Pinsky  
Hinsdale, Ill.

## Setting it straight

We received a number of inquiries regarding comments attributed to a Cullinet software spokesman in the story "Cullinet wipes the slate clean" [CW, Feb. 8]. We do not in any way take issue with the reporting done on that story. However, in order to help set the record straight, we wish to clarify the following points:

- It is our stated goal to return Cullinet to profitability in the fourth quarter of this fiscal year, and we believe we are very close to achieving that goal.

Our ability to do so will largely depend on the acceptance rate of our new release of IDMS/R and the speed with which we can increase revenues from our Digital Equipment Corp.-based products.

- The article stated that the write-downs taken in the third quarter will "result in an approximately thousand-dollar dip in the firm's break-even point for the next 13 quarters or so." A more accurate figure, however, is approximately \$1 million per quarter.

- Remarks regarding the performance of the Planning Control International, Inc. software are

related to sales performance in a changing market; for example, the market acceptance rate of the products rather than the quality of the software.

John W. Moriarty  
Director, Industry Relations  
Cullinet Software, Inc.  
Westwood, Mass.

## Who's responsible?

I have been closely following Computerworld's coverage of Section 1706 of the Tax Reform Act of 1986. The issue certainly is an important one for the software and services industry and its clients.

The editorial "Hitting a nerve" [CW, Feb. 22] included some information that could later prove very damaging.

The statement that the federal tax law insulated data processing clients from penalties for using misclassified workers — which is interesting because the law does not expressly go after DP shops if contract workers are found to violate the tax code — is incorrect.

Relying on Revenue Ruling 87-41, which was issued in May 1987, the Internal Revenue Service recently ruled that certain computer programmers — those who are placed at a client's site by a broker — were employees not of the broker but of the client.

The IRS found that the client, rather than the broker, directed the programmers both as to the work they were performing and the manner and method by which that work was to be performed.

The IRS also found that programmers' services were rendered to the client at the client's premises on a substantially full-time basis, that programmers

used the client's equipment and that they were required to submit weekly reports to the client.

In addition, the IRS said that the client deserved the right to discharge programmers if the work performed was not acceptable.

John P. Courtney  
1988 ADAPSO Chairman  
Arlington, Va.

## Opens options

Recent issues have given considerable attention to the SQL data base inquiry language.

I have yet to see mention of a program I have been using since 1984 called Open Access from Software Products International. What perplexes me is that Open Access has always used the SQL interface, yet magazines and newspapers repeatedly ignore this program.

I have had minimal user-friendliness, yet Open Access allows me to join up to eight data bases. Thanks to SQL, it is simple. The data base can also be molded into applications with the included programmer. It has a spreadsheet with windows, links or consolidate models and has goal seeking. It does three-dimensional graphics and has a word processor and communications capabilities. There is even a local-area network version of this integrated package.

Wayne Barnes  
RWB Enterprises  
Tulsa, Okla.

Computerworld welcomes comments from its readers. Letters may be edited for brevity and clarity and should be addressed to Bill Morris, Editor, Computerworld, P.O. Box 9177, 375 Chelmsford Road, Framingham, Mass. 01701.

# Working backward to strategic systems

EFREM MALLACH

 Push the talk button of any information systems guru these days and you'll hear about strategic or mission-critical systems. The concept is simple: Company X gains an edge if it can collect and then assemble data into useful information better than Company Y can.

The hard part is getting past the posturing guru stage and applying the idea to a specific company in a specific situation. When people try to invent a useful strategic information system, they often draw a blank.

This is not surprising. Most successful strategic systems are accidental by-products of systems originally developed for another reason. There are checklists that can focus attention on specific areas, but often, these do not get the creative juices flowing. Consequently, we need another source of ideas.

#### Against the grain

One approach is to do things backward. Conventional systems development wisdom says to start with the objective of a system — what it is intended to produce — and work back to the processing and the input. But in conceiving new ideas, it can help to start with the available inputs, perhaps mixed together, and see what they create.

To organize the inputs, we can use a list that divides all the data in the world into six categories. As people brainstorm for examples in each category, they usually think of useful information they did not know existed or did not realize they could get. Practical, innovative, strategic ways of combining information are quick to follow.

The first category consists of information that is already in your computer and in the right format, such as customer lists. That data can be accessed easily and used immediately. Many successful strategic systems are based on the idea of integrating the customer more closely with a supplier's internal functioning.

Next comes information that is already in your computer but in the wrong format. An example is product cost or manufacturing

scheduling data. You might let customers check directly on the production dates for their shipments. If they can do so with you and not with your competitors, naturally they will prefer to deal with you.

#### Just on paper

Now we get to information that resides somewhere in your organization but not in your computer. This third category covers paper records and information not currently captured. Federal Express Corp. gains an edge by recording via bar code readers when and where every package moves from one stage of the delivery process to the next. Their competitors generally do not.

You can do the same thing by capturing the times at which each lot moves from one production step to the next. That way, your customers can find out not only when their order is scheduled to be produced but how it is progressing in accordance with that schedule.

Fourth is information available outside your organization; for instance, government economic data to help forecast demand trends. This type of information is often grossly underutilized. Much of it is free — or already paid for with our taxes.

If the same application that customers use to dial into your manufacturing system also gives them other useful information such as industry forecasts, they will tend to dial into it often, strengthening their link with your firm.

It is a short step from this category to the fifth one: information not immediately available to you but which you think you can find. Market research data that requires a new survey might fall in here. By putting such data on your system, you add value to your product by giving customers a valuable commodity that they cannot get elsewhere.

#### A rousing idea

Last comes information that you have no idea where to get. Interestingly, once a person proposes an item in this category, somebody else often suggests where to get it. Another person may offer an idea on how this information could be used if the organization had it. And so the strategic system concept develops.

This approach lends itself to structured brainstorming. Lists of information items on flip-chart pads taped to conference room walls encourage creativity, especially if an experienced leader

# How to take the temperature of your software company

*Stop, look, listen, ask lots of questions — and become Wall Street-wise*

SHAKU ATRE

 Wall Street can be a good barometer as to the financial health of a software developer. When a stock starts to fluctuate and the dives become more frequent than the rises, a company may be headed for trouble.

A good example of dropping stock prices signaling problems is Cullinet Software, Inc. Even a rising star like Oracle Corp. needs to be watched closely on the Street. The company is doing fine today, but the stock market shows how it will do tomorrow — before customers realize any problems.

Aside from financial indicators, what are the symptoms that users should watch for to judge if a software company is heading for trouble?

• A thinly spread infrastructure. When a software company's revenue grows at a dizzying rate of more than 50% every year, the support structure cannot expand fast enough to accommodate both old and new customers.

Support on all fronts — technical, maintenance, disaster re-

Atre is president of Rye, N.Y.-based Atre Computer Assistance.



CHRISTOPHER KING

## Now, that's saying a mouthful

AMY SOMMERFELD FIORE

 What do you get when you cross an investment bank with a leader with a savings and loan? You get Boston Safe Deposit and Trust Co. — The Boston Co. — a subsidiary of Shearson Lehman Brothers, Inc., an American Express Company.

Quite a mouthful, eh? In the avalanche of mergers and acquisitions, many firms are experiencing a creeping concatenation of names. There's Sorbs, Inc., a Bell Atlantic Company. There's

Malach is a faculty member of the Boston College School of Management and a consultant to user and vendor executives. Based in Needham, Mass., he recently published *Win There Over: A Survival Guide for Corporate Consulting Firms*.

Honeywell, Inc., a Groupe Bull Company, a subsidiary of Compagnie des Machines Bull. There's Atre International Consultants, Inc., a Computer Assistance Company — which is sometimes shortened to Atre Computer Assistance.

Now consider the way the Spanish do things. You start out as Juan Cola. You marry Rosalia Hernández. Your wife becomes Rosalia Hernández de Cola, and your daughter is Juana Cola Hernández. If your daughter marries Ramón Alonso, then her son — your grandson — will be Pablo Alonso Cola. Each generation drops one name, so the children carry the heritage without gaining obese and unwieldy monikers.

If the folks at Shearson Lehman Brothers, Inc. were good Spaniards, they would have dropped the oldest name and become simply Shearson Lehman. In fact, they keep all three and amend "an American Express Company" to boot.

What's their point? Do long names carry more status? They may in some cases: IDS Financial

covery — is as important as the initial installation of the product, if not more so. Maintenance is of paramount importance: If your car is no better than your mechanic, your software is no better than your software vendor.

The result of a thinly spread infrastructure is that phone calls go unanswered or are returned too late to solve your end users' problems, leaving you to struggle on your own.

The number of unanswered phone calls appears to be inversely proportional to the success of the quarterly financial report. Software vendor sometimes forget that the high-profit members Wall Street investors so love come from customers.

Rapid organization expansion. In order to support the growing infrastructure, employees are hired indiscriminately. There is usually an insufficient number of qualified professionals in any given geographical region to fill a vendor's sudden demand for more staff. Consequently, the organization's salespeople or in-house support group often end up knowing less than some of your own staff members.

*Continued on page 27*

Corp. was acquired by American Express and now uses both names — IDS America Express — which must surely help its field representatives establish immediate credibility.

Does it gain you some recognition? It may be for Atre consultants, whose parent is known by business people in its 15 branch locations. Does it signal a certain breadth of capabilities, as in "ComputerVision Corp., a division of Prime Computer, Inc.?"

If so, then why don't we buy case of Minute Maid orange juice that say, "a Coca-Cola, Inc. beverage"? Well, for one thing, that brings to mind a rather uninspiring combination of flavors and fizz that would turn off many thirsty consumers.

For another, soft drink vendors do not need to inspire the same level of confidence. If the merger is friendly, the businesses have nothing but goodwill to gain by trading off each other's names and reputations.

So get ready to do business, perhaps comically, with Ashton-Tate McCormack Dodge Morino Sage & Cullinet, Inc.

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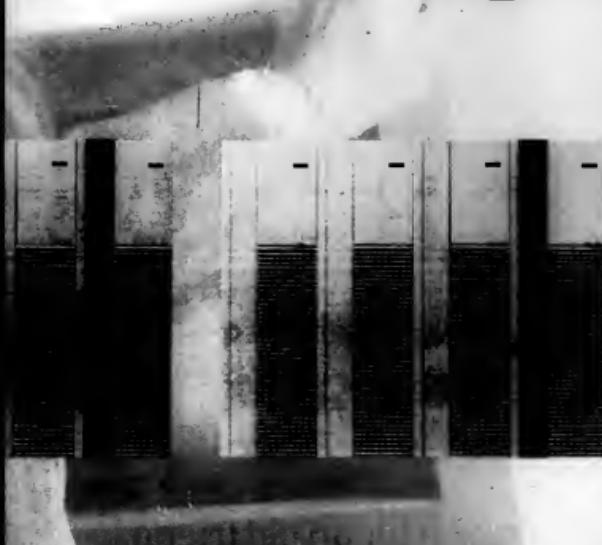
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## Temperature

CONTINUED FROM PAGE 19

about how a product really functions.

Before committing yourself to a product, prepare a list of technical questions and call the vendor's designated in-house experts. Ask specifically about using the software in your vertical market for your particular application.

Some questions you might want to research include the following: How are disaster recovery and backup as well as reorganization taken care of? Are there any customer references for the claims of increased programmer productivity? What phase of the life cycle does the productivity increase refer to — coding, testing or maintenance?

What type of work load can the software sustain when a number of other tasks are running? What technical support does the vendor provide — and in what form? How close is the next branch office that has resident technical experts, not sales representatives?

How integrated are the various components of the product line? Integration is an over-used term. The vendor must demonstrate how a change in a program or in any component of the system ripples through the rest of the software. Most vendors are purposefully vague when it comes to "change management."

Talking directly to the product experts will give you insight into the part of the organization you might well rely on following the purchase. After a contract is signed, chances are small that you will see the friendly and efficient marketing representative, unless a supplemen-

tary product is announced and you are one of the potential clients again.

- **Copycat product announcements.** Products are announced just because a competitor has introduced a similar product, and you cannot see any apparent fit between the product's features and the company's existing architecture.

- **Products for all occasions.** There are two courses that software vendors sometimes follow, and either can lead to trouble. At the one extreme, they tie all their products to one vendor's machines. As the hardware vendor encounters fortune and misfortune, so the software developer loses toward boom or bust.

- On the other extreme, the software developer operates like a kid in a candy store, wanting one of everything. Chas-

ing every hardware option means maintaining the software product across many operating systems, a resource-intensive task. In most instances, a software developer should not try to support more than one or two product lines each from mainframe, minicomputer and microcomputer vendors.

As a customer, you should inquire as to whether the software vendor spends at least 10% of its revenue on research and development of software for the hardware and operating system you use. In smaller companies, if the chief designer leaves, find out if there is a talented backup ready to take his place.

- **Jumping on the bandwagon.** Every few years a technology bandwagon comes along that vendors and customers like to

ride on: relational DBMS, CASE, distributed data bases, SQL, SAA, fifth-generation languages and so on.

Bandwagons roll on, despite obstacles in the road. For instance, there are not few people even within IBM who can convincingly explain what Systems Application Architecture is, let alone how it will be successfully implemented. In regard to languages, we are still sorting out the fourth generation, yet there are some vendors claiming fifth-generation products.

If the signs of a software company in trouble are hard to read, then watch Wall Street. Investors, even if not high-tech wizards, usually bet their money on reliable software — and reliable software companies.

## Backward

CONTINUED FROM PAGE 19

keeps the group thinking positively.

For instance, a plumbing fixture supplier could combine customer records and government demographic forecast data. It could then produce a customized report for each distributor, predicting changes in demand for its products and the specific items the store should order more or fewer of next year.

If the population in a given area is growing more affluent, kitchens there may be getting built larger; they may be getting smaller in an area where land is increasingly selling at a premium and small apartments are more popular.

Distributors are more likely to order from a manufacturer that supplies them information as well as products. Perhaps a distributor in a conservative geographical region could benefit by knowing last year's preferences in trendy parts of the country.

### Clearing the path

This sort of competitive edge is the objective of any strategic system. It is possible to achieve it on purpose, but it's not easy...

Many obstacles can arise on a company's route to a strategic system: tunnel vision gets in the way, the customer viewpoint may be difficult for many people to adopt, short-termism can seem like a waste of time to hard-driving executives and it takes a skilled leader to keep the discussions moving productively.

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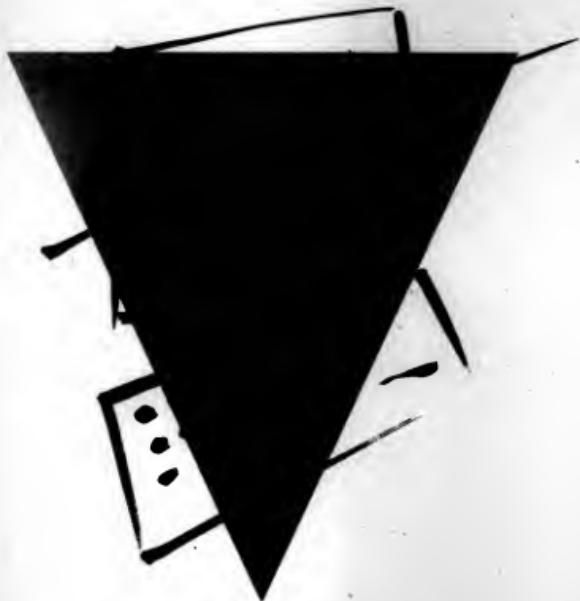
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For nearly 20 years, COURIER Information Systems has been developing and marketing advanced business systems. Today the Alcatel COURIER product portfolio includes: the 9000 Series—an advanced family of communication controllers, displays, printers; micro-to-mainframe links supporting communications between personal computers and mainframes; and local area network products.

With a record of excellence spanning

five decades, Alcatel PABX Systems offers premium quality products such as the System 3100 PABX. With the ability to handle voice and data simultaneously, the System 3100 allows you to realize significant gains in operations efficiency by using your existing office telephone lines to communicate data from one workstation to another, and to computers, word processors, printers and electronic mail systems.

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# SOFTWARE & SERVICES

SOFT  
TALK

Steven Pfrenzinger

## Re-engineer with CASE



Traditional maintenance of existing Cobol systems is a huge burden on most data processing organizations, consuming two-thirds or more of their budgets — and still growing.

Computer-aided software engineering (CASE) technology is now addressing this maintenance problem through the concept of re-engineering. The term "re-engineering" is used to describe the modernization of existing systems during the maintenance phase. It currently has three basic categories: code restructuring, reverse-engineering and major upgrades.

While most CASE vendors are offering tools for the design (front-end CASE) and development (back-end CASE) of new applications, very few have addressed the maintenance of existing systems. Most design and development CASE tools can be used successfully to maintain Cobol systems that were originally developed with these tools. However, they do nothing for the 75 billion or so lines of Cobol code written worldwide without them.

Many of these Cobol systems are critical applications that were written as long as a decade or two ago. They are usually difficult and sometimes impossible to maintain; and at a cost of \$10 to \$25 per line, a complete rewrite of the system

Continued on page 30

## Dictionary awaits ANSI seal

*Central data directory standard would alleviate product disparities*

BY NELL MARGOLIS  
CWT STAFF

NEW YORK — The American National Standards Institute (ANSI) is expected to soon put its stamp on a central data dictionary standard that could help end decades of confusion, redundancy and inaccuracy for software users and developers.

The Information Resource Dictionary System (IRDS) standard has been under development since 1980. It is an extensible dictionary system that describes, controls and manages information resources such as data bases, elements, records, screens and systems used by data processing organizations, according to David Carpenter, products development manager at Panapac Systems, Inc. and vice-chairman of the ANSI committee that drafted the proposal.

The absence of such a standard has created a situation that one user called "one of the big-

gest problems to plague the software industry."

Carpenter said users have generated multiple proprietary dictionaries, or control files, housing fragmented, disparate descriptions of information resources. In many ways, those dictionaries cramp valuable disk storage space, with redundancies, retard intraproject communication and erect a formidable roadblock to integration of off-the-shelf products.

### Code-free migration

"With IRDS, on the other hand, 'we can migrate from system to system and data base to data base without worrying about dictatorial contexts,'" said James Squier, acting chief of the data administration division of the Department of Commerce.

"This is terribly long overdue," said Vaughan Merlin, chairman of Bellevue, Wash.-based CASE Research Corp.

As proposed, IRDS is a global

repository structure to hold all descriptions of a user company's information resources to be shared by all of the company's systems development tools. It is structured to meet new requirements for information resource descriptions and defines a complete, programmatic interface that lets users query and update IRDS from within a program. The latter ability, Carpenter said, allows IRDS to function as a data base.

Three additional interfaces will be layered on top of the programmatic, or services, interface, Carpenter said. A command language interface will serve as the primary batch interface to IRDS; a panel interface will serve on-line; and a specialized dictionary-to-dictionary interface will let different implementations of the central data dictionary exchange directory schema and information.

IRDS is based on an entity re-

Continued on page 30

## M&D to customize accounting

BY CHARLES BARBOCK  
CWT STAFF

NATICK, Mass. — McCormack & Dodge Corp. wants to revitalize the maturing accounting software market by putting more options to customize its packages into the hands of its customers.

The company is starting with the old war-horse in the field — the general ledger — by offering a new version of that package with options to tailor it to a particular business. Called GL-Millennium 3.0 for M&D's previously successful integration platform and fourth-generation language, the package is slated to be available in June for \$175,000.

At the same time, M&D announced new currency management and mainframe-to-micro link packages.

Most accounting packages predefine keys and account classes, prompting businesses to fit their practices into a mold. That is one reason why half of the general ledger systems in the U.S. were developed in-house by a design team that understood the nature of their employer's business, said Lynn Sarikas, M&D's marketing manager.

The new version of GL-Millennium allows a user to set up a key by division, product, state or

Continued on page 31

## Medusa gets a face-lift

BY NELL MARGOLIS  
CWT STAFF

NATICK, Mass. — Prime Computer, Inc.'s ComputerVision division last week introduced two software packages and offered an update on the company's plans for its Medusa drafting, design and documentation tool.

Primecontrol is an engineering and management software system designed to organize and track vast amounts of product development information com-

Continued on page 31

- MCRA to slim enhanced business tools at large Unix sites. Page 32.
- Specialized products, Gamma package. Page 32.

BIMSPOOL retrieves print output from the DOS/VSE POWER spooling queue and prints it on a local or remote 3270 terminal printer via CICS. This provides FUE printing without its expensive equipment cost. (Often the 3270 printers are already in place, and lightly used.) CRT functions are provided to display queues, manage print tasks, and to view output listings instead of or prior to printing. Hundreds of users worldwide, since 1979. BIM "wrote the book" on spooling to terminal printers from POWER queues.

Options: laser printer support feature available also. Call for full documentation or free 30 day trial.

Price: \$4000, \$2000yr, or \$200mo. BIMSPOOL is also included in several BIM product group offerings.

BIM has 15 system software products for improving productivity and ease of DOS/VSE, OS, and CICS, and also performs systems programming consulting. Marketing agents in most countries.



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As a result, programmer productivity at Holly Farms has reached an all-time high. "We've seen substantial improvement ratios," Clontz said. "In the time a programmer might turn out one CICS command-level program, he can turn out from six to eight programs on MANTIS."

Most of the 500-plus MANTIS applications now in production at Holly Farms are aimed at streamlining costs. For example, Data Processing used MANTIS to develop a model of how chickens consume feed over the course of their lives, allowing Holly Farms to cut production at one of its feed mills by 15 days a week.

"We've got key users who are picking up on the term MANTIS," Clontz noted. "Around here, MANTIS has become a synonym for 'get it done quickly'."

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# MCBA re-engineers Unix accounting, manufacturing line

BY NELL MARGOLIS  
OF STAFF

**GLENDALE, Calif.** — MCBA, Inc., a leading manufacturer of accounting software for Digital Equipment Corp.'s VAX/VMS, is about to make its bid for a similar stance in the Unix market with an 18-module accounting and manufacturing software line.

Technically an enhancement of the company's current Unix line, MCBA's

Release 4 has been rewritten in RM/Cobol 85, re-engineered and expanded to include eight new modules, said Gary Hedge, vice-president of software engineering.

First-time entries include a suite of manufacturing software packages — Job Costing, Standard Product Routing, Labor Performance, Standard Product Controlling and Capacity Requirements — as well as a Fixed Assets and Depreciation module and a Sales History module featuring

analysis reports, comparisons and detailed history.

MCBA's first six packages in the new Unix series will be Accounts Payable, Accounts Receivable, General Ledger, Payroll, Inventory Management and Report Writer. Slated to be available late next month, they will be able to run on a stand-alone basis or as part of an integrated system, as will be the case with all forthcoming modules, according to Hedge.

**Repetitive tasks targeted.**  
The 18 modules, all of which are expected to ship by the fourth quarter, will function together as a manufacturing resource planning system, targeted toward both job shops and repetitive manufacturing.

Only about 1,000 of MCBA's more

than 25,000 current installations are in the Unix world, according to a company spokesman. MCBA, being keenly aware of the business world's increasing interest in Unix, hopes to greatly increase its market share with Release 4, he said.

The new line features expanded capabilities aimed at factory computers. For example, Hedge said, the current Unix line includes a general ledger code number of 10 digits divisible into two subgroups. Release 4's version allows for 24 characters divisible into five subgroups.

Release 4 packages will run on Motorola, Inc. 68000-based computers, including the UniSys Corp. Tower series and the UniSys Corp. 5000. Single-license prices are slated to range from \$1,500 to \$9,000, depending on the CPU.

## SOFTWARE NOTES

### H&W Computer sorcerer behind Wizard Mail

**H&W Computer Systems International** in Boise, Idaho, plans to sell an electronic mail system for the IBM CICS environment. Wizard Mail, recently purchased from Steel Huddle Manufacturing Co. in Greenville, S.C., includes calendaring and scheduling facilities as well as a gateway to Western Union Telegraph Corp.'s EasyLink product. Wizard Mail will be offered to data processing shops with minimal E-mail needs. The systems range in price from \$3,500 to \$14,000.

The management information consulting practice of Arthur Andersen & Co. has been named an IBM Authorized Marketing Assistant. The arrangement is intended to allow Arthur Andersen marketing directors to assist IBM representatives in selling the consulting firm's DCS/Logistics system.

**Hewlett-Packard Co.** has teamed up with Cimline, Inc., in Elk Grove Village, Ill., to market the Cimline computer-aided manufacturing package for HP 9000 Series 300 workstations. Initial shipments of the joint product are expected in July.

**London-based Unisof Corp.** will act as Motorola, Inc.'s exclusive agent for future products based on Unix System V, according to an agreement signed by the two companies. Unisof has offices in Boston. The Motorola semiconductor division is located in Austin, Texas.

**Language Processors, Inc.** in Framingham, Mass., has agreed to port its LPI-PL/I compiler to the HP 9000 Series 300 engineering workstations. LPI-PL/I is an implementation of ANSI-standard PL/I that includes an optimizer for both global and local optimization. It includes PL/I extensions for compatibility with IBM and Digital Equipment Corp.'s version of PL/I.

At a loss for props for your next presentation? E-Kee Ltd., in Dublin, Ohio, is offering a card game called Expert-Knowledge Engineer that was designed to acquaint novices with expert system technology. The company uses the card game at its seminars and is now offering it for \$9.95.

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## Pfrenzinger

FROM PAGE 27

may be out of the question.

**Restructuring code.** Code-restructuring products are one category of maintenance-oriented CASE tools that offer great potential. They essentially read the unstructured and often complex Cobol code and product from the top down, creating a structured code that is far easier to understand and maintain. All of this can be done at a cost of \$2 or less per line, making the process an attractive alternative to entirely re-specifying an older system.

Among such products is Recoder from Language Technology, Inc., a highly automated restructuring tool.

Restructuring products cur-

rently address the Cobol procedural issues, not data issues such as data name rationalization, building a dictionary or migrating to a different data base management system. Bachman Information Systems, Inc. recently announced a series of products that are focused on data issues.

An alternative to restructuring is to leave the code alone and seek an intelligent editor to help programmers analyze programs before making maintenance changes. Vinfight from Vissoft, Inc. is an example of an ISFP-based product that supports such change and impact analysis for Cobol programs.

**Reverse-engineering.** In simple terms, reverse-engineering is the translation of an end product — that is, Cobol source code — back into its design-level representations. Being able to maintain systems at this higher level is one of the most important objectives of CASE.

Elevating procedural logic and data requirements to an abstract level is the first essential step in a comprehensive reverse-engineering process that makes forward-engineering much easier.

Several vendors have already accomplished this. Lan-

## Re-engineering Rewriting existing systems\*



re-engineers the Cobol procedural logic into a high-level control flow diagram before actually restructuring the code. Bachman's products, assisted by artificial intelligence technology, use various diagrams and models to support these reverse- and forward-engineering capabilities on file and data base levels. Cullinet Software, Inc.'s IDMS/R to IBM's DB2.

**Major upgrades.** In re-engineering terms, major upgrades are oriented toward modernization rather than traditional maintenance enhancements such as adding reports to screens. They occur after the existing systems have undergone a transformation via restructuring or reverse-engineering and include moves to on-line or data base environments, changes in hard-

ware or software platforms, performance optimization and any other significant upgrade.

**Re-engineering life cycle.** Re-engineering projects have a different life cycle from new development efforts. The cycle includes: evaluating the condition of the code for all existing systems; selecting the candidate systems and programs for modernization; restructuring and reverse-engineering; applying the major upgrades, using the improved data base system; implementation; and maintaining or keeping the system structurally and maintainable in the future.

**Benefits.** The utilization of CASE for re-engineering existing Cobol applications will bring substantial productivity and quality improvements to the areas that consume the majority of the DP budget. This frees additional dollars for new development. It will also make re-engineering an appealing career path for many programmers who previously avoided maintenance assignments.

Pfrenzinger is president of Information Management Systems Consulting Inc., a Northridge, Calif.-based firm specializing in the development and modernization of IBM's DB2 DB/DC and CICS applications.

## Dictionary

FROM PAGE 27

relationship model similar to that used in many proprietary dictionaries, including IBM's. A competing repository standard promulgated by the International Standards Organization (ISO) employs a data model similar to SQL's.

Carpenter said ANSI chose the entity relationship model because "its compatibility with existing systems will allow users to convert to IRIDS in an evolutionary, not revolutionary, manner," and also because it more clearly creates the central repository as a stand-alone resource.

In contrast, "the ISO model sees IRIDS more as an extension of a data base management system," he explained. "Also, since SQL is obtaining popularity, they felt their standard would be better received by users."

However, Carpenter pointed out, the ISO dictionary standard has yet to go through a review process, "so this isn't the opinion of users, but of a bunch of dictionary experts."

While the ISO standard is winning support in such countries as Japan, the UK and Canada, the U.S. organizations are strongly backing the ANSI posi-

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tion, as in West Germany and such leading U.S. vendors as IBM, Applied Data Research, Inc., Panasophic, Cincom Systems, Inc. and Cullinet Software, Inc. Earlier this year, an IBM spokesman attended an ISO meeting and vocally threw the company's support behind the ANSI position.

"Our customer comments," said Dana Marks, IBM advisory product planner, "tell us that IRDS is the way to go."

"Ultimately, I don't see any contradiction," said Alan Goldfine, lead of the IRDS development project at the Institute for Computer Sciences and Technology at the National Bureau of Standards, which co-developed IRDS with ANSI. "We can have an ANSI standard right now. Even under the best of circumstances, I don't see an ISO standard for at least two to three years. By then, IRDS will be ready for expansion and revision anyway." At that point, he added, ANSI could adopt ISO features as desired.

One thing that is clear, Goldfine said, is that there will be a Federal Information Processing Standard. Even in the event that IRDS does not receive ANSI approval, he added, his group has stated that the ANSI version of IRDS will be such a standard.

## M&D

FROM PAGE 27

any other basis for tracking information that he wishes. A product-oriented manufacturer would do it differently from a regulation-minded utility, she noted. The user may use up to 44 characters in the key to create up to 12 reporting elements.

Instead of facing a set number of references to previous accounts, such as a budget with balances listed for the previous three years, a user can determine how many years of historical data he wants and how many versions of the budget he wants to maintain, Sarikas said. A user can also define the accounting

period in which he plans to make entries, using up to 54 in a year. Traditional accounting software offers 13 periods, Sarikas said.

Standard features of the existing Millennium product work with the new package, M&D officials said.

### Beta-test user

R. J. Reynolds Tobacco International, Inc. started working with a beta-test copy of GL-Millennium 3.0 months ago when its reporting requirements changed after acquiring Nabisco, Charlotte E. Myrick, manager of financial reporting development, said the flexibility of the product allowed it to replace an in-house system "very quickly." With the old system we would have need-

ed several months to go in and add new amount classes, vs. a few hours with M&D."

Reynolds created a table behind its master key explaining each code found in it, "a terrific function for us." The key used seven of the 12 possible levels for reporting financial data, she noted. As part of an industry with legal reporting requirements, Reynolds used GL-Millennium to create management and legal reporting structures without using two separate general ledgers, she said.

GL-Millennium 3.0 runs under IBM's MVS or DOS on 4300 or higher processors.

M&D is also offering Currency Management-Millennium 3.0, which is said to let a company

manage its business in multiple currencies working in conjunction with GL-Millennium 3.0. Also available in June, that package will be priced at \$65,000.

M&D has added a common end-user front end to its micro-to-mainframe link, PC Link 3.0, so a personal computer user can have access to both mainframe and microcomputer functions at the same time, said M&D Vice-President Dean Redfern. A selective uploading feature allows a user to point to the appropriate mainframe field on a screen for uploading micro-data.

PC Link 3.0, also available in June, will be priced at \$1,100 per micro or \$600 in quantities of 10, with a \$35,000 charge for the mainframe component.

## Medusa

FROM PAGE 27

mously housed in a large, distributed engineering data base.

Two subsystems, a Prime 50 Series minicomputer-based Central Data Manager and a Local Data Manager resident on a workstation or a separate 50 Series system, combine to oversee the flow of information through design and approval cycles, said Robert A. Fischer, Computervi-

sion's president.

The Central Data Manager module ranges in price from \$23,900 to \$75,000, depending on the 50 Series configuration. License fees for the Local Data Manager range from \$900 to \$3,800.

Primedesign, which runs on Prime's FXCL 5500 workstation, offers users three-dimensional solid, surface and wireframe modeling capabilities on an integrated basis. Design to complement Prime's Medusa

and Graphical Numerical Control software, Primedesign, in addition to a wide range of standard modeling features, uses a complex geometric technique to represent curves and surfaces with a high degree of precision, company spokesman said.

Primedesign drew favorable comments from both market analysts and beta-test users.

The software ranges in price from \$79,900 to \$104,900, which includes a Prime FXCL 5500 workstation. An optional

component, the Detangler Module, can be licensed for \$7,500.

Prime also rolled out enhancements to Medusa, including a new module for building layouts and planning. The company, Fischer said, will continue to support and enhance both its own Medusa and CIS Medusa, the flavor marketed by ComputerVision, while actively working toward a converged product that will run on Digital Equipment Corp., Sun Microsystems, Inc. and Prime platforms.

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## NEW PRODUCTS

**Systems software**

**On-Cue Release 1.4**, a menu-driven query and reporting program for IBM mainframes, has been announced by Decision Technology, Inc.

On-Cue leads the user through a path of fill-in-the-blank menus that design reports and generate input to the vendor's Decision Analyzer batch report program. On-Cue contains on-line report design capabilities, batch and machine language execution and minimal memory requirements.

Added features include the ability to

use field names in arithmetic expressions to calculate and assign the results to a new field name. On-Cue also supports requests against IMS and DL/I data bases.

On-Cue is available for use with IBM DOS/VSE and MVS operating systems using CICS, TSO or VTAM. Prices range from \$4,000 to \$8,000.

Decision Technology, 4390 U.S. Route 1, Princeton, N.J. 08540. 800-322-8370.

A product designed to improve CICS response time and relieve virtual storage constraints has been announced by Axios Products, Inc.

Fetch/XA breaks the single-thread CICS loading bottleneck by processing all program load requests asynchronously at storage-to-speed speed from IBM's MVS/XA. Its multithread loading mechanism improves CICS response time by reducing program wait on the load library. It addresses I/O, compression and overall CICS throughput problems as well.

Fetch/XA is priced at \$15,000.

Axios Products, 1155 Veterans Highway, Hauppauge, N.Y. 11788. 516-349-1900.

Symbiotics, Inc. has enhanced its Genera operating system software.

Genera Release 7.2 features improved interactive response times and upward compatibility with Genera 7.1. According

to a company spokesman, the user interface has been extended consistently across major system components.

In addition, the spokesman said, eight manuals were added to the documentation set, including a workbook for new users.

Other features include an Undo facility for the editor, a Hint facility, reduced disk-space requirements, additional metering tools with a graphical interface and a graphics system that uses the Adobe Systems, Inc. Postscript imaging model.

All Genera 7.2 sources are available as part of the operating system or on the Supplemental Genera 7.2 source tape, priced at \$7,500.

Symbiotics, 11 Cambridge Center, Cambridge, Mass. 02142. 617-621-3100.

**Applications packages**

**Aveon Corp.** has announced Release 9 of Autodesk, Inc.'s AutoCAD for Sun Microsystems, Inc. workstations.

- Autodesk Release 9 features an advanced user interface with pull-down menus, icon menus and dialogue boxes that supplement the keyboard, screen menu and digitizer template as a means of entering commands. The pull-down and icon menus are programmable.

Other new features include improved curve generation using B-splines, 2D additional text fonts, enhancements to the Autoplot programming language, support for a faster Autodesk Device Interface driver for displays and a drawing slide utility program.

Autodesk Release 9 for Sun workstations costs \$2,850.

Aveon, 119 University Ave., Palo Alto, Calif. 94301. 415-326-8686.

**Utilities**

**Executive Software, Inc.** recently announced that its Diskkeeper disk management software is now available for Digital Equipment Corp.'s Vaxstation 8000 computer.

According to Executive Software, Diskkeeper keeps the Vaxstation 8000's disks from becoming fragmented and impacting the processing capabilities.

- In addition to managing the disks, Diskkeeper groups free space at the front of the disk.

Diskkeeper is priced from \$249 to \$3,250.

Executive Software, Suite F, 3131 Foothill Blvd., La Crescenta, Calif. 91214. 818-249-4707.

A set of CICS programs that allow viewing and browsing of CICS status queues from any terminal has been released by D.L. Brickey & Associates, Inc.

CICS Log Browse includes Cobol command-level source code. It operates under CICS Release 1.5 and later under the IBM MVS and DOS/VM operating systems.

The Unedit Module reportedly removes any numeric field entry mapped in from an IBM 3270-type terminal.

The Unedit Module includes source code and sample Cobol programs and runs under IBM's MVS/XA in 31-bit mode.

CICS Log Browse can be licensed for \$600. The Unedit Module can be licensed for \$600.

D.L. Brickey & Associates, P.O. Box 614, Rochester, Ill. 62563. 217-498-8479.

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impossible with DCSS-resident programs. Not only that, but most testing is transparent to the users and faulty versions can be easily backed out while corrections are made.

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V/SEG's Autofit

feature automatically scans multiple copies of a DCSS program to find a copy that won't destroy another DCSS in a user's virtual machine. This greatly reduces the planning and management normally associated with DCSS definition and maintenance.

In addition, V/SEG creates a visual display of DCSS by virtual storage. This improved mapping utility cuts the time needed to allocate new saved systems and to adjust the location of existing ones.

V/SEG: Add it all up and it equals cost savings and improved productivity.

Easier installation. Thoroughly tested programs. No overlap. Improved mapping. Put it all together and you get V/SEG.

Not only will it save time and money by dramatically improving your VM programming staff's productivity, it will readily change what you thought you could do with DCSS. And over the long stretch, that's good for your entire company.

PIR/PIS-requested numbers for IBM Professional Office System, GDSM-requested numbers for IBM Corporate Disk Duplex Manager 1440-requested numbers for 1450, 1460, 1470, 1480, 1490, 1500, 1510, 1520, 1530, 1540, 1550, 1560, 1570, 1580, 1590, 1600, 1610, 1620, 1630, 1640, 1650, 1660, 1670, 1680, 1690, 1700, 1710, 1720, 1730, 1740, 1750, 1760, 1770, 1780, 1790, 1800, 1810, 1820, 1830, 1840, 1850, 1860, 1870, 1880, 1890, 1900, 1910, 1920, 1930, 1940, 1950, 1960, 1970, 1980, 1990, 2000, 2010, 2020, 2030, 2040, 2050, 2060, 2070, 2080, 2090, 2100, 2110, 2120, 2130, 2140, 2150, 2160, 2170, 2180, 2190, 2200, 2210, 2220, 2230, 2240, 2250, 2260, 2270, 2280, 2290, 2300, 2310, 2320, 2330, 2340, 2350, 2360, 2370, 2380, 2390, 2400, 2410, 2420, 2430, 2440, 2450, 2460, 2470, 2480, 2490, 2500, 2510, 2520, 2530, 2540, 2550, 2560, 2570, 2580, 2590, 2600, 2610, 2620, 2630, 2640, 2650, 2660, 2670, 2680, 2690, 2700, 2710, 2720, 2730, 2740, 2750, 2760, 2770, 2780, 2790, 2800, 2810, 2820, 2830, 2840, 2850, 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# MICROCOMPUTING

MICRO  
BITS

Ed Scannell

## Say what you mean, IBM



What the president means to say was... At a two-day technical impression that his company will dramatically reduce prices on its Personal System 2 series by year's end.

Lowe said, "What we will be doing is improving the price-performance offered at each of our current price points.... We have a Model 25 with an Intel 8086 today, by the end of the year, we may have an 80286 product at that price point; and by the end of 1989, or in that vicinity of time, we'll probably have an 80386-based system at that price point."

From these statements, one could justifiably think that IBM planned to drop the price of its Intel 80286-based machines to the level of its PS/2 Model 25, now priced at about \$1,300, by year's end and that its current Intel 80386-based machines would be similarly priced by the end of 1989.

Well, it appears this is not quite the message Mr. Lowe

*Continued on page 65*

## NBI's Legend ties applications

*Joins list of combined desktop publishing and word processing products*

BY DOUGLAS BARNEY  
CH STAFF

BOULDER, Colo. — Yet another entrant into the new market for products that combine word processing that combine word processing and desktop publishing was shipped last week.

Called Legend, the \$495 software package from NBI, Inc., is aimed exclusively at users of high-powered Intel Corp. 80286 and 80386-based PCs.

Other packages in this market include Pageperfect from IMSI and Total Word from Lifetree Software, Inc. Both of those packages eliminate the need to

use a separate word processor and then export text files to a desktop publishing system for fancy formatting.

These systems may also verify former Apple Computer, Inc. Chairman Steve Jobs' prediction that enhanced word processing packages will eventually eliminate the need for stand-alone desktop publishing software.

Legend joins the small but growing list of word processing packages that run under Microsoft Corp.'s Windows operating environment. NBI was apparently undeterred by Apple's recent lawsuit charging that Windows

infringes on its copyright.

Legend provides the capability to produce so-called compound documents, combining text, graphics, fonts and sophisticated formatting. The user interface is selectable and can be either menu- or function key-based. The word processing component includes table generation, word search and style sheets, which enable a user to design a page and then fill it with the appropriate text. In addition, the package can handle documents of up to 750 pages.

The system is able to import and export a variety of text file

types, including ASCII, Wordperfect, IBM's Document Content Architecture and Microsoft's Word files. It can also import data files and graphics files. Legend supports most conventional printers as well as Adobe Systems, Inc. Postscript-based laser printers.

The system requires at least 640K bytes of random-access memory. IBM's Enhanced Graphics Adapter, a 20M-byte hard disk and a mouse.

Inside

- Review: Lotus' Symphony sequel. Page 35.
- The Brooklyn Bridge ties up highway agency. Page 56.
- Symmetric: updates Time Line for high end. Page 65.



## Brand-name PCs give cheap clones the boot

BY ALAN J. RYAN  
CH STAFF

Corporate M/S departments are fueling their hardware investment by moving away from low-cost IBM clones now more than ever, instead, favoring actual IBM Personal Computers or major IBM PC compatibles.

Analysts interviewed last week said price reductions and hardware upgrades on leading compatibles, IBM's improved low-end products, the quasi-mysterious IBM Micro Channel architecture and a tumultuous dealer arena have caused more of corporate America's buyers to

stick with big-name brands.

Analyst Bruce Spahr of Framingham, Mass.-based International Data Corp. (IDC) forecasted that the market for Intel Corp.'s 8088 and 8086 processor will drop from 2.07 million in 1987 to 1.65 million this year, while the Intel 80286 processor will climb from 1.96 million in 1987 to 2.9 million in sales this year.

Yet even as more clones enter the 286 race, it is unlikely that they will win big there, either.

"From the corporate standpoint down to medium-size busi-

*Continued on page 65*

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## REVIEWS/NEW PRODUCTS

# Upgrade keeps Symphony in shadows

BY JOHN WALKENBACH  
SPECIAL TO CW

Sometimes, users of Lotus Development Corp.'s Symphony must feel neglected: Lotus's 1-2-3 gets the glory, while Symphony remains in the shadows.

Finally, Lotus has come through with a Symphony upgrade. Unfortunately, Symphony aficionados might be disappointed with Release 2.0. Most of the enhancements are in word processing, but at least copy protection has been dropped.

**Features:** Built around a 1-2-3-like spreadsheet, Symphony offers views into data by means of an integrated spreadsheet, a word processor, an outline, a data base, modem communications and graphics modules. The major enhancement to the spreadsheet function is a minimal recalculation feature, which allows you to re-calculate only affected cells.

The most impressive enhancements are in Symphony's word processing module. Added features include automatic paragraph reformating, on-screen dynamic display of page breaks, a spelling checker add-in, easier selection of character attributes and a clipboard for pasting text within a document.

You can now specify up to 256 fields in a data base record as well as insert, move or delete fields from a data base form. The communications module features a Digital Equipment Corp. VT100 terminal-emulation add-in.

**Performance:** Satisfactory to very good. Since all of Symphony's data resides in random-access memory, everything has to fit into free memory. Release 2.0 makes better use of expanded memory, however. But if you do not have Lotus/Lintel/Microsoft Expanded Memory Specification, Symphony will probably seriously limit the size of your work files.

The word processing environment is fairly fast, but it is slower than most popular stand-alone word processors. Its main drawback is its RAM dependency. Symphony's data base is a simple flat-file system. The Form mode makes it very easy to update records, indicate selection criteria and generate reports.

**Documentation:** Very



Symphony's word processing, spreadsheet modules

### Symphony Release 2.0

Price: \$995

- Performance: Satisfactory to excellent
- Documentation: Very good
- Ease of learning: Satisfactory
- Ease of use: Satisfactory
- Error handling: Satisfactory
- Support: Satisfactory to very good
- Value: Satisfactory

good. We found Symphony's new menus to be thorough, well written and organized for easy access. The on-line Help is context-sensitive and includes an index.

**Ease of learning:** Satisfactory. Mastering Symphony is no easy feat. The overwhelming number of menus, as well as the use of multiple windows, can get confusing. However, use of a common user interface helps, and Lotus provides the necessary teaching tools.

**Ease of use:** Satisfactory. Considering the complex nature of the program, once learned, Symphony is no harder to use than most other high-end applications. Symphony makes good use of the function keys, and the word processor has several accelerator keys so you can bypass the menus for some common operations.

**Error handling:** Satisfactory. Symphony responds appropriately to common error conditions such as open disk drive doors and full disks. We were surprised to discover, however, that a well-known problem remains: It is still relatively easy to abandon or overwrite a worksheet without saving it. On the plus side, the word processing environment now has an Undo function.

delete function.

**Support:** Satisfactory to very good. Lotus staffs its customer support phone lines — which are not toll-free — from 8 a.m. to 5 p.m. Eastern Standard Time. A premium support service, called Prompt, costs \$75 per year. This includes a toll-free telephone number, 15 unlimited-time calls during the period of the subscription and lens books and demonstration disks of new Lotus software.

Both the calls we made to Lotus were handled by knowledgeable technicians after only a brief time on hold.

**Value:** Satisfactory. Its \$995 price tag places Symphony Release 2.0 on the expensive end of the personal computer software spectrum, but it does buy a lot: a 1-2-3-equivalent spreadsheet, a good word processor with a spelling checker, a functional data base management program, simple communications capabilities, rudimentary graphics functions and a powerful macro facility — and they all work together.

Wadebach is consumer research manager for testing services and lens correction in Southern California.

### Note on reviewers

The reviews presented in this section are encapsulated versions of columns published recently in *Information and International Data Group publications*. The text is transmitted by the IDG News Service and edited by Suzanne Whist.

## Flexcache 20386 goes Compaq one better

BY STEPHEN SATCHELL  
SPECIAL TO CW

Advanced Logic Research, Inc., has improved its line of Intel Corp. 80386-based computers with the introduction of its Flexcache 20386 series.

The Flexcache 20386, like Compaq Computer Corp.'s Deskpro 386/20, implements a dual-bus architecture that separates 32-bit memory from the rest of the system.

But with Flexcache, Advanced Logic Research has gone Compaq one better. Not only is the system faster than the Deskpro 386/20, it is also considerably less expensive.

**Features:** The Flexcache 20386 runs at 20 MHz with virtually no wait states. The floor-standing unit comes standard with 1M byte of 80-nsec random-access memory. The system board can handle up to 2M bytes of RAM, with an additional

### Flexcache 20386

Price: \$2,595 to \$3,595

- Performance: Poor to excellent
- Documentation: Good
- Ease of use: Satisfactory
- Setup: Very good
- Serviceability: Good to very good
- Value: Very good

8M bytes available. A 20-MHz Intel 80387 math coprocessor can be plugged into the system board.

The Flexcache 20386 uses the Intel 80385 high-performance caching controller chip with 32K bytes of 35-nsec cache RAM. Advanced Logic Research claims the computer will find RAM data in zero-wait state cache memory more than 95% of the time. The other 5% of the time, the RAM search requires two wait states.

The system board has two 8-bit slots; four 16-bit slots and a pair of slots that provide 32-bit memory expansion but do not accept standard controller cards.

The basic system comes with a battery-powered clock/calendar, an enhanced IBM Personal

Continued on page 39

## SlideWrite Plus tops charts for ease, support

BY KEN MILBURN  
SPECIAL TO CW

Recently updated to Version 2.10, Advanced Graphics Software, Inc.'s SlideWrite Plus shines at providing flexibility in formating data for business, scientific or statistical graphs.

But other presentation graphics packages are significantly stronger in the support of slide-making output devices and capabilities for producing illustrations and word charts.

**Features:** SlideWrite Plus provides formats for seven major graph types: bar, line, pie, scatter, high-low, area and mixed. The program has extensive user options for displaying charted text and data. For instance, line text can be displayed as straight lines or curves.

Most of the standard options for choosing color, fill patterns, marker style, line style and text style are available. You can put several new charts of any type on a page. You cannot, however, con-



SlideWrite Plus provides business, scientific graphics

trol the width of a bar or the width of a line in a high-low chart. You also cannot rotate horizontal axis labels if text

### SlideWrite Plus Version 2.10

Price: \$245

- Performance: Good
- Documentation: Satisfactory
- Ease of learning: Very good
- Ease of use: Good
- Error handling: Very good
- Support: Very good
- Value: Good

would otherwise overlap. And there is no way to specify the weight or color of border frames.

SlideWrite Plus includes Draw and Text modules. Drawing capabilities are rudimentary compared with those in Lotus Development Corp.'s Freelance or Software Publishing Corp.'s Harvard Graphics.

SlideWrite Plus's drawing primitives include lines, arrows, boxes, circles, text and a library of 101 figures. The text module is for typing bulletted word lists in the preferred type style and size.

**Performance:** Good. SlideWrite Plus efficiently performs its calculations and displays the graphical results on-screen. Executing commands, bringing up forms and regenerating charts occur instantaneously on a 10-MHz IBM Personal Computer AT.

Data entry limits for each of the modules are quite generous. You can have 2,600 text characters on a page and 4,000 data points in a chart. You are invited

Continued on page 39

## T1 Risk Management Spotlight

# The Sudden Appearance Of Network Carpetbaggers.

Beware of "Johnny-Come-Lately's" who talk a good game but don't hold all the essential cards.

**I**t's a rough world out there for anyone trying to make an educated buying decision—the right decision about communication networks.

On top of sorting out your own needs against constantly shifting carrier regulations and rapidly evolving technology, there's the problem of sorting out the vendors, the claims, the promises—all of which seem to be multiplying faster than fat cats around spilled cream.

So, how can you travel through this world of fantasy and smoke, negotiate the risks, and arrive at a successful network strategy?

Learn to ask the right questions.

### How To Avoid Network Carpetbaggers.

Ask the right questions. We'll give you a few to get started. And while we're giving you questions, we'll also give you answers. The General's answers. We believe you'll find they're the right answers to the right questions. And that they'll help you separate the "Serious Contenders" from the "Great Pretenders" in your search for a qualified network partner.

*How long have you been developing data communications products and network strategies?*

The General introduced its first modems, data sets and multiplexers in 1969. Communications, from small systems to multi-national networks, has been our only focus since that time.

*How big is your installed T-1 customer base?*

The General has the largest installed T-1 customer base in the industry.

*What distinguishes you from all other network vendors?*

We're a true, single source solution. We can design, build, stage, test, install, manage, service and upgrade your network and never lift the phone to dial a third-party vendor. Not for products or services.

*What distinguishes your network products from everyone else?*

The General's entire network product line stands apart for three reasons: it was developed within a strategic framework that anticipates regulatory changes and options; it was developed for global operations within a systems context, thus each element not only serves specific functions, but also critical network management and control requirements; and it was designed to provide long-term flexibility to meet the challenges of growth while maximizing the initial systems investment.

*How do you ensure that your network products reflect emerging standards and opportunities?*

The General has an entire staff dedicated to tracking trends and forecasting regulatory changes. That allows us to develop technology that maximizes network options. Typical of that is our development of MEGASWITCH<sup>TM</sup>, the industry's premier DACS compatible T-1 multiplexer, which allows our network partners to take full advantage of AT&T's current and future public service offerings without sacrificing the benefits of private networking. It gives them the best of both worlds, all under the control of a single network management system.





*How can you ensure my network's integrity?*

You can only ensure network integrity by building it from the smallest system level to the largest. By designing and manufacturing all the elements you

need to build a network, we're uniquely positioned to deliver products developed within a systems framework. Products that feature true backward and forward compatibility, true point accuracy in locating and recovering from system failures. Products that, when joined together in a tightly designed network, give you total network management—down to desktops—from a single central site.

*Can you support and service my network?*  
The General's Network Services Division offers comprehensive, worldwide systems integration, support and maintenance—all under the supervision of assigned, dedicated program managers. You'll never have to worry about who to call or what to do when you have a problem. And you'll never have to sit on your hands waiting for it to be solved.

**"You can only ensure network integrity by building it from the smallest system level to the largest."**

**Get More Of The Answers You Need.**

Call the General, General DataComm, and find out more of what you need to know. Call the number below and, for starters, we'll send you our TRUTH OR CONSEQUENCES wheel. It's a handy tool for learning the TRUTH about network vendors before you pay the CONSEQUENCES.

And when you call, ask to see one of our sales representatives. They've got a lot more questions—and answers—that can help you distinguish the big players from the big talkers in communications networks.

And these days, you need all the help you can get.

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See Us At WAVE 88 Booth # 801

## Flexcache

CONTINUED FROM PAGE 35

**Computer AT-style keyboard, one serial port, one parallel port, a 1.2M-byte floppy disk drive and a hard disk of 60M, 100M, 150M or 300M bytes. It can hold two full-height and three half-height drives.**

**Performance:** Poor to excellent. We found Advanced Logic Research has achieved its goal of outperforming the Desapro 386/20. We traced the system's slightly faster CPU speed to main RAM: Advanced Logic uses 80-nsec chips, and Compaq uses 100-nsec chips. Hard-disk performance is equally outstanding. The 150M-byte enhanced small device interface drive and controller racked up im-

pressive values on our benchmark test.

However, the system falls in the area of hardware compatibility. It does not support any third-party memory boards. The only problem with software compatibility is that the 386 offers only 20- and 10-MHz compatibility speeds.

**Documentation:** Good. The manual is clearly written and well organized. It includes installation and operation information as well as a table of contents and an index. There is no glossary. Flaws include minimal troubleshooting information and the lack of instructions for installing storage devices.

**Ease of use:** Satisfactory. With the exception of the power switch, located behind a door in the rear of the unit, all operator controls are within easy reach. If you

are using the Flexcache 20386 as a file server or in a multiuser operating system, however, you cannot automatically restart the system if the console is locked.

**Setup:** Very good. Advanced Logic Research provides everything for setup except an operating system. Installing internal options is simple, as the side panel is easily removed. The vendor also provides utilities for initializing the hard disk.

**Serviceability:** Good to very good. The system is double-cased, and the inner case bolts into the floor stand. The hard disk is self-parking. The soldering job is up to par, and we found no evidence of last-minute changes.

Advanced Logic Research offers a one-year limited warranty on the Flexcache 20386. Repairs are handled by both au-

thorized dealers and the vendor. Extended warranties are available for up to three additional years. Advanced Logic Research also offers a 30-day money-back guarantee. A non-toll-free technical support line is available from 8 a.m. to 5 p.m. Pacific Standard Time, and it answered all our questions quickly and accurately.

**Value:** Very good. The Flexcache 20386 is priced considerably lower than comparable Compaq systems. The 20386 Model 60 sells for \$5,990, contrasted with Compaq's price of \$7,499. The remaining models are also priced competitively, ranging from \$6,490 for the Model 100 to \$9,990 for the Model 300.

Suzell is Infoworld's director of hardware testing.

## INGRES DBMS TURNS YOUR WORKSTATION INTO A POWERSTATION.



**Power.** Most people take it for granted. But with the power of INGRES DBMS you can maximize workstation productivity. And that's something no one takes for granted.

Here's what INGRES means to you: Our distributed database capabilities give you the power to put the right information in the hands of the right users, across a network of different operating systems, databases and hardware.

### POWER OF THE DISTRIBUTED DATABASE.

In a network of workstations and servers, it all comes down to access. With INGRES in place, workstations users can transparently access any information in a network, without knowing where it resides. And with INGRES/STAR, the distributed data-

base, users can access and integrate data across a wide spectrum of hardware and operating systems. Sun, Apollo, DEC VAXstations and Hewlett Packard applications can access data from each other or from servers running VAX/VMS or UNIX.

### POWER TOOLS.

To make the perfect relational DBMS, it takes more than just transparency and distributed capabilities. It takes the very best in end-user and application tools to increase productivity, and to provide for complete portability. And that's where the power of INGRES really comes through. Our innovative 4GL leads the industry in functionality and performance, and we're continuing to set the pace with new tools designed especially for the workstation environment.

### PEAK PERFORMANCE.

INGRES contains a powerful database engine that maintains a high level of efficiency at all times, while preserving data consistency and integrity. With its unique optimization and high speed transaction capabilities, network traffic is minimized and superior performance is maximized.

Call us today and find out why INGRES is the one relational DBMS that can power up your entire network.

Torn on the power of INGRES? call 1-800-4-INGRES for more information. And ask about our free INGRES seminar.

**INGRES**  
RELATIONAL TECHNOLOGY  
ASSOCIATES

This chip  
is too smart  
to be in  
a personal  
computer.



*The Intel 80386  
microprocessor*

# Introducing the corporate 386.



Copyright © 1988 Sun Microsystems, Inc. Sun386 and The Network /& The Computer are trademarks of Sun Microsystems, Inc. Sun and the Sun logo are registered trademarks of Sun Microsystems, Inc. UNIX is a registered trademark of AT&T. Intel is a registered trademark of Intel Corporation.

The 386-based personal computers offer the individual raw power.

But, in most corporations, the real work is done by many people, all trying to work together. Computers should aid this process, by giving individuals the personal power they need, and by helping groups of people work together productively.

Different groups need to share and work with the same information, even though they may be using different computers, or their data is kept on remote mainframes.

Personal 386s fall short of meeting these needs. Because they use under-powered and primitive operating systems.

So they can't handle the really demanding applications. And they only talk to themselves, with some difficulty, rather than to all of your computers.

That's why we're introducing the corporate 386. The Sun386™ workstation. It has the same high-performance Intel® 80386 chip as the PCs.

But not their personal limitations.

Because it runs Sun's open, distributed computing environment, built around the UNIX® operating system.

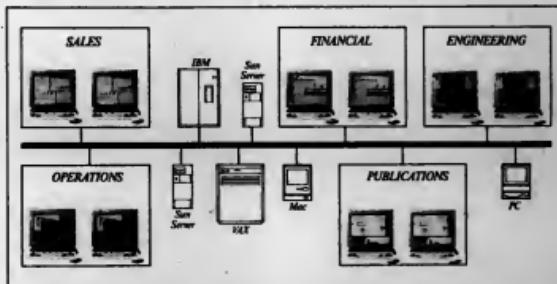
So, you have transparent access to every computer in your company. No matter which vendor's name is on the box.

Unlike the PCs, the Sun386 lets you take full advantage of the thousands of powerful applications designed around the UNIX operating system. But it also lets you run all of the PC

DOS applications that millions of users have developed so much expertise in.

And with its 5-MIPS power, UNIX and DOS applications can run simultaneously and at full speed.

But with all this power and



In real-world corporate applications, PC users need access to a large variety of computing resources. So the Sun386i runs Sun's open distributed computing environment, built around the UNIX® operating system. Which lets it become part of a powerful open network that can include every computer in your company.

sophistication, isn't a Sun386i harder to use than a PC?

Not at all. In fact, it's easier.

Because we've given it a friendly, icon-oriented user interface with an integrated help facility. And a file organizer, to easily find, open, and keep track of files all over the network.

There's even an automated network administrator, that lets you personally install the Sun386i in minutes. Instead of hours.

So look to Sun for total networking solutions that help pull a company together.

If you'd like to know more, call 1-800-223-6736. In CA 1-800-322-6736. And we'll show you the difference between a personal machine.

And the right corporate choice.



The Network Is The Computer™

**STRATUS INTRODUCES THE XA2000 MODELS 50 AND 70.**

# Now OLTP is within everyone's reach.

With the introduction of the XA2000 Models 50 and 70, Stratus has extended its OLTP platform. Making it easier than ever for you to extend your business.

#### DISTRIBUTED PROCESSING MADE AFFORDABLE.

Our new Models 50 and 70 represent an economical yet powerful on-line transaction processing solution to the cost and performance issues of local processing.

Included are all the characteristic Stratus features: the lowest cost per

X A 2000 MODEL 50



transaction, transparent fault tolerance, rapid-fire processing, and modular expandability. All neatly packaged in a compact 34" or 54" chassis that you can install anywhere.

#### ALL THE RIGHT CONNECTIONS.

The Models 50 and 70 provide fast links to Stratus hosts or other vendors' systems. And they offer more communications options than ever, including an ingenious new independent subsystem that efficiently takes charge of communications, leaving your CPU's free to process transactions, and allowing you to easily custom design an OLTP network that meets your own needs.

#### SERVICE COULDN'T BE EASIER.

All our XA2000 systems are so advanced, they self-diagnose and, if necessary, dial for help themselves - while your application keeps running at top speed! And our comprehensive Remote Service Network ensures that no matter how far away you are, you are connected to the Stratus Customer Assistance Center for immediate personal attention.

Today, major firms worldwide in financial services, brokerage, manufacturing, retailing

X A 2000  
MODEL 70



and telecommunications rely on Stratus technology to build global OLTP networks. With the introduction of the XA2000 Models 50 and 70, the Stratus OLTP platform becomes even more accessible. For more information, call your local Stratus representative or phone (617) 460-2192.

# Stratus

The OLTP Solution.

## NEW PRODUCTS

## Systems

Four Intel Corp. 80286- and 80386-based IBM-compatible personal computers have been announced by TBS International.

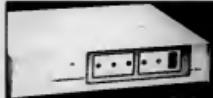
The TBS Turbo Plus machines feature 1M or 2M bytes of random-access memory, a 655M-byte hard drive, eight expansion slots, 10 I/O ports, a 220W power supply, a 101-key keyboard and a monochrome monitor. The TBS Turbo Plus 386/16, priced at \$1,299, operates at 16 MHz. The Turbo Plus 386/12, priced at \$2,099, operates at 12.5 MHz. The 386 machine features a 10-MHz bus, and the 286 machine features an 8-MHz bus.

The TBS Turbo series consists of entry-level machines. The Turbo 286/12, priced at \$1,299, operates at 12.5 MHz and includes 512K bytes of RAM, a 20M-byte hard drive, a 1.2M-byte floppy drive, a keyboard and I/O ports. The Turbo 386/16, priced at \$1,999, operates at 16 MHz.

TBS International, 20 Main St., Ashland, Mass. 01721. 617-881-7322.

A personal computer-based data acquisition and control system that includes BASIC programming has been announced by Aerostream Corp.

The Acro-400E is said to be capable of performing a programmed routine while completely separated from a host



The Acro-400E

computer. It can be programmed by downloading a program from a host or by way of a dumb terminal. Programs may be stored in the battery-backed semi-random-access memory. Data stored in dynamic RAM can be off-loaded to a host.

Other features include 16 differential analog inputs, 32 digital I/Os and up to two analog outputs. Communications to a host is via the standard RS-232C/RS-485 serial interface. Up to 31 units can be multidropped, the vendor said.

The standard Acro-400E costs \$1,695, including the Acrolog 400 software package.

Aerostream, P.O. Box 487, 66 Cherry Hill Drive, Beverly, Mass. 01915. 617-927-6880.

A floor-mount tower enclosure that supports a standard IBM Personal Computer AT motherboard as well as combinations of four fixed- and removable-media 5½-in. drives has been announced by Sigma Information Systems.

The SA-H124/AT features a keylock on/off switch and an LED that may be used for disk access indication. The rear of the chassis contains a keyboard connector, a jack for a composite monitor and a nine-pin connector for a monochrome or red-green-blue monitor.

The SA-H124/AT can optionally mount Sigma's diskpacks to replace the AT motherboard. It costs \$944.

Sigma, 3401 E. LaPalma Ave., Anaheim, Calif. 92806. 714-630-6553.

## Software applications packages

Micro Design, Inc. has announced a modular format for its field services software package, Concert.

The modular format enables field service operations to choose only the functions best suited to fit its needs, the vendor said. The Concert system includes five interactive modules: Call Handling and Dispatch, Inventory, Invoices, Auto-page and Contracts and Technical Assistance. The modules are integrated, the vendor said, so the user does not have to

exit one module to access another.

Modules are priced from \$500 for Autopage to \$2,650 for Dispatch. A site license costs \$6,700.

Micro Design also announced a scaled-down version of Concert for smaller organizations. Called Ensemble, it costs \$2,975 for a site license.

Micro Design, Suite 509, Benjamin Fox Pavilion, Jenkintown, Pa. 19046. 215-884-1112.

A three-dimensional modeling and analysis software package for use with IBM Personal Computer ATs and compatibles has been announced by Innovative Computer Aided Technology, Inc.

DES-3 is a free-form design system.

For wire-frame geometric construction,

it features standard point, line and circle as well as ruled and sculptured surfaces with annotation and labeling capabilities.

For geometric modification and manipulation, the features of DES-3 include grouping, filleting, 3-D space curve transforms, dynamic rotate, scale and pan, multiple plane projection and intersection and full 3-D geometric curvilinear analysis.

DES-3 is priced at \$5,000.

Innovative Computer Aided Technology, Suite 2, 14979 Prairie Ave., Lisle, Ill. 60530. 213-644-2949.

A computer-aided process planning system designed to run on IBM Personal Computers as well as Digital Equipment

*Continued on page 44*

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## LEAVE DEVELOPMENT TROUBLES BEHIND

With Realia's development tools, you can build efficient mainframe applications right on your PC. Every stage of development gets easier, whether you're maintaining an existing application or creating a new one.

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## MICROCOMPUTING

*Continued from page 43*  
Corp. VAX workstations has been announced by Housatoc Manufacturing Systems, Inc.

The Housatoc CAPP manufacturing process planning system enables users to create a data base of manufacturing procedures for use in generating shop floor instructions, quality control manifests and other documents.

Features include the ability to recall large blocks of standard text from the data base and insert them into a process plan; system security options; real-time validation of data, text and entry formats; and a report generator.

The software costs \$1,000.

Housatoc, 318 Bear Hill Road, Waltham, Mass. 02154. 617-890-2811.

A Lotus Development Corp. 1-2-3 work-alike spreadsheet package has been introduced by Goldstein Software, Inc.

Called Joe Spreadsheet, the package provides a maximum spreadsheet size of 256 columns by 8,192 rows, supports full macro language and is available in both 5½- and 3½-in. formats. It also runs all 1-2-3 templates, the vendor said.

Other features include an on-screen file name, an on-screen guide to function keys, an on-screen reminder of the available random-access memory, a warning signal if the spreadsheet is changed, an automatic generation of backup files and the ability to write both 1-2-3 1A and 2.0 file formats.

Joe Spreadsheet, priced at \$49.50, does not support color graphics or ex-

tended memory and is not copy protected.

Goldstein Software, Suite 340, 12520

Prosperity Drive, Silver Spring, Md.

20904. 301-622-9020.

A computer-aided design and engineering integrated software package for end-to-end circuit design, simulation, printed-circuit board layout and circuit board fabrication has debuted from Visionsics Corp.

EE Designer III accommodates up to 2M bytes of above-board memory using the Lotus/Intel/Microsoft Expanded Memory Specification. Features include a user interface with a three-button mouse and hierarchical menus, a prompt line, 1,284- by 960-pixel graphics resolution and support for the IBM Enhanced Graphics Adapter and Color Graphics

Adapter.

EE Designer III costs \$3,995. Visionsics, 343 Gibraltar Drive, Sunnyvale, Calif. 94089. 408-745-1551.

A payroll module for the Multiple Business Management System has been introduced by Financial Information Systems.

Features of the system include the ability of users to define all employee deductions and employee expenses and the ability to define multiple work locations. Several miscellaneous payments can be credited to the employee per pay period. Pay frequencies may be established for each pay transaction. Government report requirements are adhered to, the vendor said.

The module will replace the existing module in future releases. It can be purchased separately or as part of the full system. It also can be added to existing systems, with the data converted automatically.

The module costs \$595. Financial Information Systems, Suite 107, 411 Industrial Drive, Richardson, Texas 75081. 214-680-8696.

Infoteam Turbo Accounting, an accounting software package featuring five modules, has been announced by Infoteam Designs, Inc.

The modules include general ledger, accounts receivable, invoicing, accounts payable and check writing. Each module features built-in tutorials. The system operates in real time, and on-line customer and vendor maintenance, monthly budgeting with comparisons, and management reports are all standard.

The software comes on 5½- or 3½-in. diskettes. It costs \$99.

Info Design, 445 Enterprise Court, Bloomfield Hills, Mich. 48013. 313-334-9790.

A software program designed for plotting data collected from laboratory experiments, prototype testing or engineering analyses has been introduced by Binary Engineering.

Techgraphpad is said to integrate data retrieval, data manipulation and data output requirements. It stores data generated by its own built-in editor or that has been entered in spreadsheets such as Lotus Development Corp.'s 1-2-3 or Symphony. It also provides a range of plotting and graphing capabilities, including line, log-log, R-T plots and others.

Other features include repetitive graphing, recall and overlay of previous graphs and color control output to Hewlett-Packard Co. or Houston Instruments, Inc. plotters.

Techgraphpad runs on IBM Personal Computers and compatibles. It costs \$275.

Binary Engineering, 100 Fifth Ave., Waltham, Mass. 02154. 617-890-1512.

A text data base for personal computers has been announced by Dataflight Software.

The Concordance Information Retrieval System supports editing, input and retrieval of both formatted and unformatted data. According to the vendor, the product accepts input for most media, including existing text and data base files, optical scanners and manual typing.

Features include the ability to perform keyword, Boolean, context and re-

*Continued on page 45*



TECHGRAPHPAD  
TEST AND DATA  
PROCESSING

Some companies  
make workstations  
for just about  
anyone.

# We engineer ourselves with a passion for performance

While some companies sell a lot of computers because they make something for everyone, we sell a lot because we don't.

All the workstations we make, the applications that run on them, and the networking power that unites them with the other computers in your company were created for a select group of people.

Namely the engineers, product designers, software developers and other professionals who demand nothing less than ultimate compute performance.

People who clamor for access to processing power and graphics. Who possess an insatiable appetite for information. And who can ill afford to endure the delays, limitations and obstacles that typically hinder the effort to attain it.

If you're such a person, you should have an Apollo workstation. For you'll realize the moment its screen is in front of you that the issue of performance is behind you.

An Apollo workstation will grant upon you enough dedicated compute power to keep your imagination charged permanently. Letting you choose from a compatible family of workstation systems whose prices start as low as a personal computer and whose per-



# y for those formance.

formance extends to that of supercomputers.

These machines will grant you imagery so brilliant you won't want to blink for fear of missing something. With real time two- and three-dimensional graphics that render up to 16.7 million colors at 130,000 vectors per

second. And they'll open your eyes even wider with networking power and elegance.

Every Apollo workstation, from the Series 3000™ Personal Workstation™ to our new Personal Supercomputer™ functions as a command center from which you have unequalled access to data, processing power, development tools, and applications. So that every mainframe, minisuper, and microcomputer on your network is at your beck and call.

In a manner almost invisible to you, our workstations show you networking performance you probably thought impossible.

For with the industry's first implementation of Network Computing Architecture™, they make your multi-vendor network appear as one computing environment.

Letting you run a single application on a network of computers by automatically dispatching portions of a program to the processors most qualified to execute them. And providing the tools to develop and debug code running on different machines.

All while freeing you to create applications, access network resources and even move from one operating environment to another with whatever language, menus and file names you define.

A fact that might inspire you to wonder if we don't engineer our workstations only for you.

Today, there is more than one way to measure computer performance. But when the criteria include processing power, graphics and network computing, nothing measures up to Apollo.



## apollo

For more information, call 1-800-323-1846 In Massachusetts call 1-800-847-1011 Or write Apollo, 330 Billerica Road, Chelmsford, MA 01824  
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*Continued from page 44*

lational search logic; virtual memory manager; pull-down menus; context-sensitive Help; an English-like query language; and Script and Browse mode.

Concordance runs on IBM Personal Computer, PC XT, AT and Personal System/2s. It costs \$295.

Dataflight Software, Suite 68, 10573 W. Pico Blvd., Los Angeles, Calif. 90064. 213-785-0623.

A formatted-field indexing system that allows long text files to be retrieved by 16 formatted fields has been announced by RHM & Associates.

Autotrieve 16 was designed to support text files of any length, in any format and containing any information. Accord-

ing to the vendor, existing text files may be used without rewriting.

Features include the ability to combine directories and information types and to add historical data.

Autotrieve 16 costs \$39.95. It runs on Microsoft Corp. MS-DOS-based micros.

RHM & Associates, 913 Heles St., Midland, Mich. 48640. 517-631-9334.

A personal information management software program has been announced by Symantec Corp.

Called Grandview, the product allows users to outline plans, memos, letters, lists and other action items and then to track and organize the information. It also allows users to view data in customized ways.

Grandview runs on IBM Personal Computers. It costs \$295. Symantec, 111 Easy St., Mountain View, Calif. 94043. 415-964-6300.

A word processor that uses a graphical interface with icons, drop-down or pull-down menus and Help facilities has been announced by Digital Research, Inc.

Gems 1st Word Plus offers such standard word processing features as a spelling checker, a mail merge utility, pagination and search and replace as well as hyphenation, footnote management, decimal tabulation, personal style sheets and mouse- or keyboard-driven block operations.

Other features include on-screen visual support for international characters,

superscripts and subscripts as well as what-you-see-is-what-you-get display.

Up to four windows can be opened simultaneously, the vendor said.

Gems 1st Word Plus is priced at \$199. Digital Research, Box DRI, Monterey, Calif. 93942. 408-649-3896.

An object-oriented graphics package said to provide freehand drawing and editing capabilities to IBM Personal Computer users has been announced by Microsystems Engineering Corp.

Mass-11 Draw 5.0 allows users to scale and edit pictures, convert sketches to precise bezier curves, trace and convert scanned raster images to compressed vector images and use word processing functions within the graphics products. Print resolution is from 300 to 2,500 dpi.

Other features include 1% gray scaling; rotating and scaling combined object support for Adobe Systems, Inc.'s Postscript; zoom range of 32-to-1; and a symbol library.

Mass-11 Draw 5.0 costs \$495. Microsystems Engineering, Suite 400, Hoffman Estates, 2400 W. Hassell Road, Ill. 60195. 312-882-0111.

A free-form page makeup software package has been introduced by Texet Corp. for use with its Texet Live Image Publishing System.

Freepage is a graphically oriented package that allows the interchange of text and graphics with Live Image Publishing Systems. It supports interfaces with all devices supported by Texet, using standard Texet drivers.

Freepage documents typically consist of both text and graphics that can be moved and reshaped to facilitate page design.

Text can be typeset in a variety of fonts, styles and sizes with automatic hyphenation, track and pair kerning, justification and letter- and word-space control.

Freepage costs \$2,500. Texet, Box 127, 37 Broadway, Arlington, Mass. 02174. 617-641-2900.

CG Type for the Macintosh, the link between desktop publishing and Compositional typographic systems, has been announced by Compositional Corp.

The typefaces provide users of Apple Computer, Inc.'s Macintosh personal computer with access to the Compositional library. Supported by any Macintosh program, CG Type can be output to any printer that supports Adobe Systems, Inc.'s Postscript language.

CG Type packages for the Macintosh initially offer one typeface in matching weights — roman, italic, bold and bold italic. Screen fonts are included for each typeface.

The typeface packages are priced from \$145.

Compositional, 200 Ballardvale St., Wilmington, Mass. 01887. 617-658-5600.

Mansanita Software Systems recently announced the Payroll module of Businessworks PC for IBM Personal Computers.

The payroll system is said to be capable of handling an unlimited number of employees, tracking such items as dates of hire, review and termination, cash and charged trips, sick leave, vacation and comp-time hours and wage history.

*Continued on page 52*



## The CompuServe data network and Sherwin-Williams. Uncovering new ways to cover the earth.

Discover the packet data network chosen by Sherwin-Williams and other leaders in every major industry.

CompuServe's value-added, packet-switched network has an impressive list of customers, including many major corporations, government agencies, retail organizations, universities, banks and hospitals.

For over a decade, CompuServe has worked with Sherwin-Williams to implement systematic solutions to communications problems. Currently, hundreds of employees across the country depend on CompuServe for local dial access to the central Sherwin-Williams data center in Cincinnati, Ohio.

According to the Sherwin-Williams Company, "We selected CompuServe because of the reliability, performance and economic advantages their network could bring us. CompuServe has continually

provided us with the services that have met our critical communications needs of our organization."

Review some of the specifications that make CompuServe a trusted partner:

- Local access from 300 metro areas.
- Equal price access for all size cities.
- Exclusive fixed cost options.
- 2400 bps NCP access.
- 9600 bps dial access.
- 99.8% reliability at every entry point.
- Real time optimum call routing.
- Nationwide support through 30 offices.
- Accounting and allocation reports.
- Real time remote diagnostics.
- Full backbone and switch redundancy.
- Multiple security and access privileges.
- Support of X.25, ASYNC, IBM 3270 & 3280, and POS protocols.
- Gateways to international public data networks.
- Cellular, FM and satellite in test.

Let us uncover new ways to help you serve your remote users. We'll take the time to understand your business.

Yes, please send me more information on the CompuServe packet data network.

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That's why you should be seeing Novell for total network software solutions.

As a networking leader, Novell has pioneered the tremendous rise in PC-based networks. Today, Novell's vision of networking starts at the desktop and expands outward toward the goal of total computer connectivity.

That vision begins with NetWare,<sup>\*</sup> the recognized standard for local area network operating systems. With an installed base of over a million workstations, NetWare puts power in the hands of network users at all levels: from ELS NetWare, for entry-level solutions, to SFT<sup>™</sup> NetWare, providing high-performance system fault tolerant networking.

Beyond NetWare, Novell offers PCOX<sup>™</sup> software for linking PCs and LANs with mainframes and minicomputers. And bridging software to connect separate LANs.



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Novell also provides programming tools like MHS, and Btrieve® and XQL® file management software. Plus extensive support for independent developers of network applications.

With all these software products and more, Novell gives greater flexibility and reliability to your network. And pushes the total networking spectrum closer to seamless connectivity.

End your search for powerful network software. See your Authorized Novell Gold Reseller, or call 1-800-LANKIND.

*For more information, call from your modem 1-800-444-4472 (300-1200 baud, 8 bit, no parity, 1 stop bit) and enter the access code NVSOF7.*



NOVELL

For network solutions,  
you should be seeing red.

*Continued from page 48*

The system produces paychecks and stubs and is said to be able to handle after-the-fact payroll. It also tracks state and federal tax liabilities and deposits.

The Payroll module costs \$395. Other account modules cost \$295 each, or \$695 bundled together.

Monsoon Software Systems, Suite 200-A, One Serraglio Plaza, Roseville, Calif. 95678. 916-751-3880.



Monsoon's Payroll module

### Software languages

Digitalik, Inc. has introduced an Intel Corp. 80286- and 80386-based implementation of its Smalltalk programming language.

Smalltalk/V 286 runs in protected mode and can address up to 16M bytes of memory directly, the vendor said. It was designed to operate with both IBM PC-DOS and OS/2 operating systems and is

compatible with Smalltalk/V.

Smalltalk/V 286 is priced at \$199.95. Registered owners of Smalltalk/V are able to obtain upgrades from Digitalik for \$75.

Digitalik, 9841 Airport Blvd., Los Angeles, Calif. 90045. 213-645-1082.

### Software utilities

Watcom Products, Inc. has announced an optimizing C compiler called Watcom C6.0 and an integrated C development environment called Watcom Express C.

Watcom C6.0 has a debugger, fine-tuning capabilities, a register allocation scheme, true register variables and flow analysis. It comes with a copy of Watcom Express C. Watcom Express C is an integrated editor, compiler, debugger, linker and run-time system.

Both products run on the IBM Personal Computer and Personal System/2. Watcom C6.0 costs \$495. Watcom Express C costs \$125.

Watcom, 415 Phillip St., Waterloo, Ontario, Canada N2L 3X2. 519-886-3790.

A software-based security system for IBM Personal Computers has been announced by AZ-Tech Software, Inc.

DataSafe allows the user to prevent unauthorized use of data as well as to encrypt one or more data files. Users can also scramble off-site backups. According

to the vendor, DataSafe can make files invisible to DOS, and obsolete files can be wiped clean.

DataSafe costs \$49. AZ-Tech, 305 E. Franklin, Richmond, Mo. 64085. 800-227-0644.

A key-indexed file management system designed for use with any programming language in either single- or multiuser local or network environments has been announced by MacSoft, Inc.

Called Axene, the IBM Personal Computer and compatible software is based on a three-level binary tree structure. It uses a common protocol to interface with application programs written in Basic, Cobol, C, Fortran, Pascal and assembler. Files created by a program in one language may be accessed and updated by programs written in any of the other languages.

File management functions include automatic data encryption and compression, file creation and deletion, record retrieval, record insertion, replacement and deletion, optional write verification, record suspension and activation, record hold and freeze.

Axes costs \$595. MacSoft, P.O. Box 1044, Atlanta, Ga. 30355. 404-923-5448.

A personal computer-based software program designed for loading data into existing Lotus Development Corp. 1-2-3 and Symphony spreadsheets has been announced by Research & Planning.

Called Is2Lot, the software loads data into spreadsheets by matching labels in an input file to labels in a spreadsheet. Data and formulas in the spreadsheet are not erased and input data may be created on any mainframe, minicomputer or PC, the vendor said.

Individual users can share the same input file for different spreadsheet formulas and layouts.

Is2Lot is priced from \$100 to \$600.

Research & Planning, Suite 2323, 222 Third St., Cambridge, Mass. 02142. 617-547-5061.

A software product to help developers understand Ashton-Tate Corp.'s DBase code has been announced by Clear Software, Inc.

Clear for DBase reads the source code of any DBase application and instantly provides the syntax tree chart, program flow chart and formatted source listing, the vendor said.

Clear runs on IBM Personal Computers. The dot matrix version costs \$99.95 plus \$5 for shipping and handling. With a Hewlett-Packard Co. LaserJet option, it costs \$149.95 plus \$5 shipping.

Clear Software, Suite 204, 637 Washington St., Brookline, Mass. 02146. 617-323-4720.

### Software storage

A line of tape backup systems for IBM's Micro Channel architecture was recently released by Grace Systems Corp.

Dubbed the Galaxy/MC series, the systems make it possible to transfer files from older IBM Personal Computer XTa



Grace's Galaxy/MC series

and PC ATs to Personal System/2s. The line is also said to be cross compatible with other Galaxy tape systems.

The Galaxy/MC is available in 60M-byte data cassette form and 60M- or 125M-byte streaming tape cartridge. Both internal and external systems are available.

Prices range from \$1,250 to \$2,500.

Grace Systems, 73 E. Trimble Road,

San Jose, Calif. 95131. 408-432-9090.

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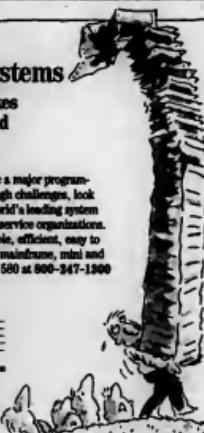
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For information on the PRIME EXL 316



**Prime Computer, Inc.**

An internal half-height compact disk/read-only memory (CD-ROM) drive has been introduced by Amdek Corp.

Called the Laserdeck 1000, the drive fits into a single floppy drive slot on IBM Personal Computers and compatibles. According to the vendor, it provides users with simultaneous access to information in text, audio or graphic form. Each compact disk can store 552M bytes of information, which is equivalent to 270,000 pages of text, 5,000 images, one hour of sound or 150 floppy diskettes.

Priced at \$895, the Laserdeck 1000 includes an interface card, a device driver, cable, audio software and Microsoft Corp. MS-DOS CD-ROM extensions.

Amdek, 1901 Zanker Road, San Jose, Calif. 95112. 408-436-8570.

An external disk drive designed for use in migrating data between 5½- and 3½-inch diskettes has been introduced by Practical Office Systems, Inc.

The Practical Ulcro Datadisk provides formating capabilities at 720K bytes as well as at 1.44M bytes and can coexist with installed drives in IBM Personal Computer XT's, PC AT's and compatibles, regardless of the DOS version, the vendor said.

Priced at \$379, the Practical Ulcro Datadisk comes with a controller card and utility software.

Practical Office Systems, 3972 Walnut St., Fairfax, Va. 22030. 703-385-3332.

The High Capacity Series I 150M- and 300M-byte hard-disk subsystems for

IBM Personal Computer ATs, Personal System/2s, Intel Corp. 80386-based microcomputers and Apple Computer, Inc. Macintosh systems have been announced by N/Hance Systems, a division of Symphony Systems, Inc.

The HCS-PC5150 and HCS-PCS300 hard-disk subsystems provide 148M and 299M bytes of formatted storage respectively for IBM PCs. The drives provide 16.5 msec average access time. The HCS-Mac150 and HCS-Mac300 are the subsystems for the Macintosh.

The HCS-PC5150 costs \$3,699. The HCS-PCS300 costs \$5,299. The HCS-Mac150 costs \$3,499. The HCS-Mac300 costs \$4,399.

N/Hance, 908R Providence Highway, Dedham, Mass. 02026. 617-461-1970.

## Board-level devices

Advanced Computer Solutions International has announced two models of its Graphix 20/20 graphics controller: the Model 20/20 MS-40 and 20/20 MS-48.

The new models include appropriate monitor support files for NEC Corp. MultiSync I and II, NEC MultiSync Plus and NEC MultiSync XL.

Advanced Computer also announced an Autocad device interface driver for Autodesk's AutoCAD Release 9 for the 20/20 products.

Features of the driver include screen save functions, three user-configurable palettes, an optional menu overlay feature and basic single-monitor operation support. The Graphix Model 20/20 MS-40 and 20/20 MS-48 controller cards cost \$1,795.

Advanced Computer Solutions, Suite 330, 2105 Lura Road, Carrollton, Texas 75006.

A video BIOS system that enables Hercules Computer Technology, Inc. monochrome graphics adapters to emulate IBM Color Graphics Adapters has been introduced by Hercules Digital.

The Hercules BIOS system supports all Hercules graphics adapters, the vendor said, including Plus, Incolor and Rainforest cards. The system consists of random-access memory-resident software that replaces the ROM BIOS video program as well as a printed-circuit board emulation adapter that installs in any available expansion slot.

The Hercules BIOS system costs \$60. Hercules Digital, Suite 567, 2351 College Station Road, Athens, Ga. 30605. 404-354-4522.

An add-on motherboard said to convert a Zenith Data Systems Model 248 computer into a 32-bit Intel Corp. 80386-based machine has been announced by American Microtronics, Inc.

Two versions of the Zenith card are available, operating at 16 or 20 MHz. Both are capable of zero-wait state operation, the vendor said. A 32-bit piggyback memory board was also released for the Zenith card, providing up to 8M bytes of CMOS memory.

According to the vendor, the boards run IBM PC-AT as well as all 386 operating systems.

The 16-MHz version costs \$2,595. The 20-MHz version costs \$2,995. The memory board option costs \$695 with no memory installed and \$7,795 with 8M bytes of memory.

American Microtronics, Suite A, 18005 Skypark Circle, Irvine, Calif. 92714. 714-261-0693.

A backfilling memory board designed for the IBM Personal Computer AT has been announced by Boca Research, Inc.

Called Tophat II, the add-on board uses a 64K- by 4-byte random-access memory (RAM) chip, so it requires only six RAM chips. It is compatible with both IBM PC-DOS and OS/2, the vendor said, and it operates at CPU speeds to 10MHz. Tophat II provides automatic parity checking, connects to a standard 16-bit bus and backfills system memory from 512K to 640K bytes.

Tophat II is priced at \$145. Boca Research, 6401 Congress Ave., Boca Raton, Fla. 33487. 305-997-6227.



Unshielded Screen Image

## Buy The One On The Left And You'll Have To Put It Where The Sun Don't Shine.



The monitor on the right, however, can be placed anywhere you like. Even in direct sunlight. It's the new Flat Technology Monitor from Zenith Data Systems—winner of PC Magazine's coveted "Technical Excellence Award" in the hardware category for 1987.

### You Have To See Zenith Believe It

So clear. So precise. So lifelike. It's the only monitor with a completely flat screen. A breakthrough that has redefined monitor quality forever. Industry experts are already convinced. And once you see it in person, you'll be a believer, too.

### Bigger, Brighter, Glare-Free

Our Flat Technology Monitor has an impressive 14-inch display. And even though it's bigger, it's 50% brighter than conventional CRT's and it has 70% greater contrast. So you get colors with greater depth and definition that make your reports, charts and graphs come alive like never before.

The Flat Technology Monitor is virtually glare-free. So you can work longer without the usual headaches

and eyestrain. And that means greater productivity. But to get the whole picture, you have to see it with your own eyes.

### Backward And Forward Compatibility

You also get full compatibility with the high resolution VGA Video generated by IBM's new PS/2 computers. And with Zenith's 2449 or other VGA-class video cards, you can enjoy CGA, MDA, Hercules and EGA graphics as well.

### Experience Zenith's Latest Technology Breakthrough

Obviously, a mere picture can't do justice to our new Flat Technology Monitor. It demands a face-to-face evaluation. For a hands-on demonstration, call today for the name of your nearest authorized Zenith Data Systems dealer—the Flat Technology Monitor is available in quantities right now.

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Computing System Proposal  
for  
the Legal Industry

PAT -

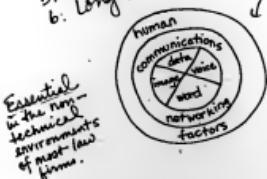
THIS IS A LAW FIRM  
WITH U.S. AND INTERNATIONAL  
SYSTEMS REQUIREMENTS. I'VE  
ADDRESSED THEIR MAJOR  
REQUIREMENTS/NEEDS  
LET'S DISCUSS YOUR  
THOUGHTS ASAP

STEVE  
4/4

Steve -  
I've made some  
comments and  
additions and  
Pat 4/4

while I know we don't  
want to get too technical  
in our response - make  
sure, the firm understands  
Wang's overall strategy -  
Six customer needs/  
Six technologies

1. Systems for today and tomorrow
2. Complete Solutions
3. Multi-vendor environments
4. Realization of past investments
5. Sensitivity to the user
6. Long term relationship



N.B.

This is a representation, not an actual, Request For Proposal.  
It is designed to demonstrate Wang's preparedness to meet the  
challenges that face the legal industry. It is intended to  
provide summary information for data processing and legal  
professionals.

We welcome your comments and invite your input.

#### Project Overview/Purpose

This firm has traditionally been dedicated to employing leading-edge technology to make better, faster, more informed decisions on behalf of its clients. In an era in which clients themselves have vastly improved their technological capabilities, they expect nothing less from the law firm which represents them. As part of this continuing effort, the partners have decided to implement an integrated and distributed law office automation system which will assist them in providing improved services to their clients through increased professional productivity and client communications.

The firm is international, with offices of varying size dispersed throughout the world. As such, the vendor must consider and be able to address environments in which there is a variety of existing equipment, different currencies and business practices, as well as the issue of different time zones.

The firm prides itself on its respected international reputation and for the quality of its practice, and will not simply purchase technology for technology's sake. In this day of client cost consciousness, the chosen technology will be managed by the firm's existing staff. The firm is not interested in having, nor does it expect its clients to pay for, a large number of data processing professionals.

Vendor's solution must include application development tools, productivity tools, capability to effectively manage databases, and an easy-to-use and powerful inquiry tool and an ad hoc report generator. Solution must lend itself to utilization (and possibly extension) by the non-technical user.

*Emphasizing the PACE  
training and that  
it's perfect for the  
non-technical user.*

#### Wang Response

Wang's fourth generation database offering, PACE, uses a relational DBMS which allows the entire user community within the firm to share select data pertinent to their work as litigators, researchers, paralegals, administrative assistants, etc.

PACE is unique in its ability to effectively manipulate data, text, voice and image files. PACE also allows users to develop complete applications without necessarily needing the skills of a professional programmer.

Wang, as part of the strategic relationship, will provide a comprehensive needs analysis in order to best apply PACE in the firm's environment.

When compared to the traditional development methods, PACE can provide very significant reductions in application development lead times.

Since the firm anticipates that information processing requirements will significantly increase over time, vendor must describe CPU growth path -- for processors resident in both the host and on the desktop -- as well as the software growth path.

#### Wang Response

Wang's family of 32-bit processors provides you a seamless upgrade path, thereby avoiding complex conversions as you upgrade CPU's. In addition, Wang's family of personal computers offers power at the desktop as well as Wang VS systems access and compatibility. The Wang PCs are all fully IBM/AT compatible and support OS/2. Further, the integration of Wang WP and Pagesetter™ on Wang PCs offers the user a complete desktop publishing solution.

Wang's design strategy has also historically been sensitive to human factors. Therefore, Wang will offer a solution which does not require replacement of familiar systems or complicated retraining as the system grows.

For more than a decade Wang has maintained a consistent user interface. Additionally, because of our architecture and corporate commitment to preserving your investment in application software, only minor changes are required to run programs that may also be ten years old.

Let's make sure we  
don't get too technical -  
what you're saying is  
that Wang systems don't  
need to be replaced when  
they need more horsepower.

.. Business is  
not disrupted.

The solution which is chosen by the firm must be able to make full use of the important role which a phone system plays in the practice of law.

#### Wang's Response

Wang's solutions incorporate leading-edge customer access capabilities. Wang STEP (Speech & Telephony Environment for Programmers) transforms a customer's telephone into a vehicle to access database information compiled by the firm.

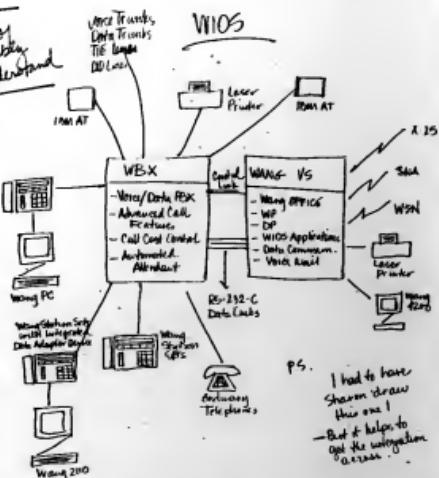
The Wang Integrated Office System (WIOS) provides the integration of voice and data. The WIOS system utilizes the Wang VS, on which all Wang Systems Networking (WSN), software such as PACE, WP+, and all 3rd party software solutions reside, the Wang Business Exchange (WBX) which is a digital office controller, and the Wang Station Set (WSS - "the phone").

The WIOS system provides system administration the ability to allocate and administer time charges, providing cost savings and control for the firm. Additional features include:

- 80 character LCD display
- Built in speakerphone
- Speed dialing and directory
- Automatic answering of incoming calls

The firm can use this to capture billable attorney time.

A diagram of WIOS is probably easier to understand



The solution must include flexible client time accounting which suits the firm's special business needs; firm management reporting must also be able to access data from integrated general ledger and accounts payable systems.

### Wang Response

Wang has a wide variety of applications software developed and implemented through third-party software providers with special expertise in legal systems. Among these solutions are state-of-the-art software packages for:

- o calendar/docket Also mention our strategic relationships with Computerized Data, Ciptech, Deloitte & Touche, West Publishing, Information Management Consultants, Astrom Software Services MSM Business Services - but now we've acquired Informatics!
  - o conflict-of-interest systems
  - o integrated general ledger and accounts payable systems
  - o legal time billing/accounting systems which accommodate different currencies and varying international financial practices.

Essential to the firm is a fully functional word processing editor with features to assist in legal document production. Vendor should address ability to provide this sophisticated word processing capability.

Wang Response

Wang's solution includes an extremely advanced word processing editor, WP Plus, with enhanced capabilities for the legal industry. WP Plus is not only capable of integrating the technologies dealt with in this RFP, but is also capable of operating on any size Wang VS without conversion or upgrade.

The firm regards timeliness of receiving information as extremely important, as well as the ability to merge into one communications network the various electronic databases which the firm must access daily. Vendor must address technological advancements which can improve intra- and inter-office communications.

#### Wang Response

The Wang solution employs an integrated strategy for large-scale systems integration. Wang Systems Networking makes transparent the differences in the local and wide area networking protocols, therefore providing seamless communications across the entire organization. Wang not only connects the firm's network through multi-vendor integration, but also provides the ability to manage and administer the network as well. Wang Systems Networking will support numerous point-to-point or multi-point communications links to a VS in other parts of the country or the world. WangPac enhances this ability even further. Across Wang's own X.25 international network, one WangPac link can support 24 concurrent users. Every user on the system will be supported by Wang OFFICE, an electronic mail and messaging system designed to serve as the umbrella application which manages all the technologies proposed in this RFP.

As to standards, Wang solutions conform to de facto and generally accepted industry standards, including:

- o SNA/SDLC
- o RJE 3777
- o 2780/3780
- o CCITT X.25
- o IEEE 802.3.

posting the  
long OFFICE  
recording action  
imported from  
several countries  
downward back  
and forth.

This means that while several people can access EXTS or WESTLAW, others can be transmitting ABANet, others and still others could be accessing ABANet.



Communications are not just Wang to Wang or just within the firm, but also with the client, Wang to IBM, and Wang to DEC.

Vendor's solution must be capable of handling large amounts of documents and files in complex cases and must address the limited amount of space and large number of people who must access the firm's records management system. Although not a mandatory requirement for the RFP, vendor should present their capability in the area of imaging and image processing, especially as it relates to documents typically stored by the firm in paper form.

Wang Response

Words are just one component of an integrated office solution. The documents and files which are generated on the part of both the client and lawyer can be managed by Wang's Integrated Image System (WIIS).

WIIS is a comprehensive system of managing, processing, and communicating text, data, and image information. The firm can capture contracts, judgments, wills, trust documents, corporate records, damage appraisals, etc. that are typically stored off-line in paper form. The system allows the firm to access documents more efficiently, reduce filing and storage costs, and improve management and handling of paper documents.



# We Laughed When You Sent Us Your Button Contest Entries!

## Announcing the Winners of the 1988 Computerworld Button Contest.

When we challenged you in March to make us laugh, we were looking for humorous slogans for our annual button contest.

We got them.

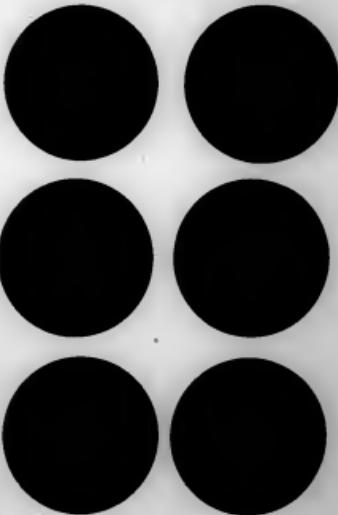
Your response was impressive, to say the least. And your slogans were terrific. We received hundreds of responses from all over the United States. They were all quite good, so choosing just six winners was no easy task.

But it was enjoyable. Our panel of Computerworld judges was thoroughly entertained by your creativity.

Be sure to look for these buttons at upcoming trade shows and conferences — the 1988 buttons will debut at Comdex Spring, May 9-12, so stop by the Computerworld booth and pick up yours.

Congratulations to the winners and many thanks to all who entered. We'll see you again next year!

The Winning Slogans of the 1988  
Computerworld Button Contest:



**COMPUTERWORLD**

An IDG Communications Publication



**SEE US AT COMDEX - BOOTH #1214**

# Bridge keeps the Victor from spoiling

BY JAMES DALY  
CNET STAFF

ATLANTA — Robert Naumann was trying to figure out how to save his stable of Victor Technologies, Inc. 9000 personal computers from becoming very expensive paperweights.

Six months after the Federal Highway Administration (FHA) purchased the machines for eight of its southeastern offices, Victor was floundering. "The machines never really caught on, and the company never offered any support," said Naumann, a management analyst for the

FHA. "Finally, the company went belly-up into Chapter 11."

With a tight budget and a data base already developed for the Victor machines, the department could not simply abandon the machines. But it was hard to feel comfortable entering data into a machine that seemed doomed. The 9000s were still functional, but their support and service base was gone.

Instead of continuing to fix a leaky boat, the agency decided to buy a new one. A new order went out that the FHA would be switching to IBM Personal Computer ATs. But there was one significant

problem: the Victor machines were not IBM compatible.

"We had two choices: relay in all this information, which was a depressing thought; or modem the stuff over, which was going to be rather expensive," Naumann said.

The modem method was out. "But sending data between just two microcomputers used to call for two modems and two packages of communication software. That totaled \$600, tied up two telephone lines and took forever to send one large file," Naumann said.

Partway through the modem transfor-

mation, Naumann stumbled onto The Brooklyn Bridge, a \$129 data transfer utility released by White Crane Systems in Norcross, Ga. "We were looking for anything that could communicate between Victor and IBM, and I think we got the only thing that can do the job," he said.

The hookup went rapidly. "We used the same software and cable and just hooked each end up to the serial port of the machines," Naumann said.

## Speed of light?

Where the modem method was transferring data at 1,200 bps/sec., The Brooklyn Bridge was able to operate at 115K bps/sec. "Immediately, we were able to transfer the data about 100 times faster than the modem hookup and without tying up the telephone lines or attaching a modem to each machine," Naumann said.

Another added benefit came when the first IBM Personal System/2 models reached Naumann's offices. "We faced similar compatibility problems transferring data from the 5½-in. floppies on the AT to the 3½-in. floppies on the PS/2," Naumann said. "We take the same cable used to connect the Victor and the AT and plug it into the PS/2 and the AT. It kills two birds with one stone."

Field representatives who take NBC Corp. laptops on inspections and enter data on-site can also use The Brooklyn Bridge to move the data into the IBM PC data bases.

## Wyse decision: ink multiuser deal with SCO

SAN JOSE, Calif. — Wyse Technology, Inc. reported recently that it will market the Santa Cruz Operation, Inc.'s (SCO) Xenix 386 operating system under a \$2 million, three-year coleasing agreement, which will mark Wyse's entry into the multiuser market.

Wyse's distributors have estimated that between 10% and 30% of its microcomputers are used as part of multiuser systems, according to Michael Richman, marketing vice-president at Wyse.

Wyse/SCO Xenix will be independent of Wyse's Intel Corp. 80386-based systems, according to Wyse officials. Under the agreement, Wyse has licensed SCO Xenix and may resell it during the next three years. Wyse and SCO will jointly support the package until the third quarter of this year, Wyse said. After that time, Wyse alone will support the product.

## Making it easy

Richman said Wyse opted for Xenix because of its relative ease of installation. AT&T's Unix operating system required altering a number of widely used third-party applications software packages for Wyse microcomputers.

Wyse will examine SCO Xenix until a standard merging Xenix and Unix is available, Richman said. He added that he expects the two operating systems to be combined sometime during the next year.

Priced at \$695, Wyse/SCO Xenix is currently available to Wyse resellers.



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# PC-based security package boasts risk analysis, planning

BY ALAN ALPER  
CWT STAFF

**TARRYTOWN, N.Y.** — A Dutch consulting company that has its U.S. headquarters here is marketing a software package that helps companies assess potential data and physical security threats and craft contingency plans.

Parnassus, Inc., a division of Microlife-Holland, recently acquired U.S. marketing rights to the package, which was de-

veloped by Conoco BV of the Netherlands. The package, which runs on the IBM Personal Computer and compatibles, contains six different modules that cover a wide variety of data center security procedures, including risk analysis and contingency planning.

The risk analysis module estimates an organization's monetary risks and provides a cost/benefit assessment of possible security measures. "The package includes statistics gathered from a variety

of sources that tell a company when something could happen," noted Willem de Vries, Parnassus' president.

Also included are an audit module that evaluates existing data security measures, a guideline and procedures module, a review diary and a control module that links each individual module. The modules cost from \$4,000 to \$25,000 and require a system running Microsoft Corp.'s MS-DOS Version 2.1 or higher with a minimum of 256K bytes of memory.

Parnassus is also offering a set of question-and-answer diskettes called "riskettes" to aid in a quick analysis of all physical security issues. Data center managers rate on a scale of one to 10 their exposure to a variety of security risks and are provided with feedback on where the

dangers lie.

Areas covered include access control, fire prevention, environment, systems and application software, data security, contingency planning and off-site storage. The diskettes cost \$180 each.

Data stored in the contingency planning module can be transferred directly to Wordperfect Corp.'s word processing package for report writing purposes. de Vries said. "For many companies, it takes one year to plan and another year to put a contingency plan together," he noted. "With this package, it takes longer than a week."

The package has been marketed in Europe for five years, de Vries said. Customers include Price Waterhouse's Holland branch, he added.

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## Innovative rolls out Mac spreadsheet

**LENEXA, Kan.** — Taking a stand opposite Microsoft Corp.'s Excel, Innovative Software, Inc. recently announced a spreadsheet package for Apple Computer, Inc.'s Macintosh that integrates numbers, charts, words and images.

Scheduled for second-quarter delivery, the product, called Wings, features "what you see is what you get" or WYSIWYG, capabilities and a fourth-generation language for use in applications development.

Wings is designed to do everything from straight spreadsheet applications to computer-aided design and manufacturing," a company spokeswoman said.

According to the firm, the heart of the product is the spreadsheet, which features a 32,768- by 32,768-matrix. The built-in text processor allows the addition of blocks of text, each measuring up to 22 by 22 in., with multiple fonts, styles or sizes and formulas. The word sheet can also be used as a data base to sort, search and query, the vendor said.

Standard graphics capabilities encompass desktop presentation and charting functions. Included are 21 basic chart types, a palette of 16 million colors, 256 patterns and shades, three-dimensional rotation of images and automatic data smoothing. Charting types included are polar, pie, layer and wire-frame.

With WYSIWYG capabilities, users can generate and lay out numbers, charts, words and images on a single screen and then output to a single printed page, the vendor said, simplifying the transition from data to business reports, proposals and presentations.

The Wings development environment is based on innovative Hypercard programming language. Commands and functions include array processing, global and local variables, procedures with parameter passing and other structured programming commands.

Also offered in Wings are windowing, dynamic links to spreadsheets, automatic or manual layout, password security and data encryption.

According to the Innovative spokeswoman, Wings, which has not reached the beta-test stage, should cost less than \$500. It will run under the Macintosh Operating System and Apple's A/X implementation of Unix.

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## Brand-name PCs

CONTINUED FROM PAGE 33

nesses, the [IBM PC AT compatible] is not a strong buy right now," said analyst Clare Fleig of the International Technology Group (ITG) in Los Altos, Calif. "The systems doing well right now are Intel 386-based like Compaq's portable or Tandy's 386 model."

John Murphy, senior consultant at Wohl Associates in Bala Cynwyd, Pa., said IBM is currently offering its authorized dealers substantial promotional discounts on PS/2 Model 60s that are often passed along to the customer. A 40MB-hard-drive version can be obtained for less than \$3,000, he said, adding that aggressive pricing is making competition more difficult for the clones.

Michael Goude, an analyst at The Yankee Group in Boston, agreed. "The clones can't get much cheaper than they already are."

ITG's Fleig said most companies not

**T**HE CLONES can't get much cheaper than they already are."

MICHAEL GOULDE  
THE YANKEE GROUP

buying into IBM's latest and greatest still want the most technologically advanced products they can get. "They want to stay in the DOS world with a vendor they can trust. In that market, low-cost clone sales are almost nonexistent," she added.

Additionally, the higher-end competitive vendors are offering better price/performance ratios with their "classic bus" products in response to the Micro Channel architecture. "In the last year, since the emergence of the PS/2, there is a definite downturn in clones," Fleig said.

Lloyd Cohen at IDC said one vendor taking a hard hit is Leading Edge Hardware Products, Inc. in Canton, Mass. The company, which once made some inroads into corporate America, saw its U.S. shipments fall from 189,000 in 1986 to 140,000 in 1987. Meanwhile, IBM has announced that it will ship its two millionth PS/2 unit later this month; the product line is one year old.

But the falling off of sales to some corporations and medium-size businesses does not augur failure for the clones. Their sales are still strong to the small business and home markets, said JoeAnn Stabel of Stoerboard, Inc. in Dallas.

Although corporations are more likely to buy through direct sales forces than through retail channels, firms that do hit the stores tend to buy brands they trust.

Additionally, established dealers are more likely to get business from corporations.

"There's a very high churn in the lower tier of dealers," said The Yankee Group's Goude. "It's one thing for a vendor to say it's got 500 dealers, but are they really 500 that aren't lost yet?"

On the low end, Goude said, IBM's PS/2 Model 25 and Model 30 are more likely to be accepted in corporations than their lower-priced competitor. Part of the reason, he said, is that the low-end competition often ends up in the hands of dealers who have a low profile in corporations, and the competition is high.

## Time Line revamp targets high end

BY STEPHEN JONES  
CW STAFF

NOVATO, Calif. — Symantec Corp.'s Breakthrough Software Division is positioning its Time Line 3.0 project manager as a high-end alternative, featuring advanced outline capabilities and an interactive Program Evaluation and Review Technique (PERT) chart, to the product's earlier version.

Time Line 2.0 will continue to be aimed at small-business users with floppy disk-based DOS personal computers, while the enhanced version was designed

to run on Intel Corp. 80286 and 80386-based PCs with hard disks, Symantec said.

The firm is betting that as much as 60% of the 100,000 current Time Line users will upgrade to the 3.0 package, according to Rod Turner, general manager of the Breakthrough Division.

### Requirements

Time Line 3.0 requires 640K bytes of random-access memory, IBM PC-DOS Version 2.0 or higher and a hard disk. The project manager costs \$595, with a \$195 upgrade charge for Time Line 2.0 users.

Turner said 75% of the program's code was reworked to include the outlining functions that help users manage large schedules, multiple projects and reports.

The PERT chart allows users to enter and edit notes for reports while viewing the chart and features automatic layout and zoom capabilities that display each level of an outline.

If a mistake is made in the development of an outline, users can tap an undo-redo function that can retract a project's steps with no limit to correct an error, Symantec said.

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## Scannell

CONTINUED FROM PAGE 33

wanted to convey. At another IBM seminar held in late March, IBM's Mike Maples said Lowe was "not necessarily promising these sorts of price cuts on existing PS/2s." He said Lowe was only referring to the price/performance improvements advanced technology has permitted in the past — and will continue to allow in the future — and that IBM will take advantage of it.

It's funny, though, that every publication attending the Boca Raton conference assumed the same thing: that IBM will dramatically reduce prices on existing systems. According to one IBM insider,

what Lowe means to get across was that IBM will improve the functionality of a system like the PS/2 Model 25 or 30 by adding its Micro Channel and keeping the machines at the same price point. Similarly, the source said, IBM will upgrade current 286-based machines to 386-based machines while keeping them, too, at their current price points.

### Gorbled transmission

Now some might say this is like the difference between calling something six of one or half a dozen of the other, but this misinterpretation could cause IBM some problems with its corporate accounts. When corporations read that IBM was planning to significantly reduce prices, some began thinking it might be wise to

hold off on buying PS/2s until the price cuts were announced — price cuts that it now seems will not be coming.

IBM would be smart to more clearly articulate its pricing strategy before customers begin building future purchasing plans around what they believe Lowe means. The company is rumored to be making some major product announcements in Dallas in June. Maybe a lot of this will get straightened out then.

Actually, corporate customers waiting for IBM to dramatically lower prices on PS/2s before they buy don't have to wait. Just a couple of weeks ago, Computer Town, a mail-order chain, had a three-day sale advertising PS/2 Model 60s with 44-MB drives for \$2,995 and Model 50s with 20M bytes for \$2,595.

One competing dealer said Computer Town can't be making more than \$350 to \$400 from each Model 60 at that price. Some dealers must be fearing the pressure to maintain their authorization under IBM's latest quota increases. However, it's a situation that a lot of companies could take great advantage of.

### Hardly hurting

But it appears IBM's shipments of PS/2s haven't been hurt too badly by this pricing confusion. The company announced it will ship its two millionth PS/2 sometime this month. Of course, this gets into IBM's definition of "shipped," but that's a subject for another day.

**Speaking of PS/2s.** A recent study released by Focal Research Systems concluded that IBM finished last year with a firm grasp on the Fortune 1,000 that it had when the year started. While IBM's fortunes were up and down over the course of 1987, its share of new business was 68% by the third quarter, spearheaded by the PS/2 line. The company's share of new business had dropped to 56% in the second quarter, down from 61% in the first.

Focus believes IBM's position in the market will improve as developers begin delivering OS/2-compatible applications, which will further drive up PS/2 sales.

Scannell is a Computerworld senior editor, microcomputing.

## Pact aimed at speeding slide transmission

MOUNTAIN VIEW, Calif. — Software Publishing Corp. and Autographix Inc. have signed an agreement that allows Harvard Graphics users to receive 35mm slides and transparencies overnight.

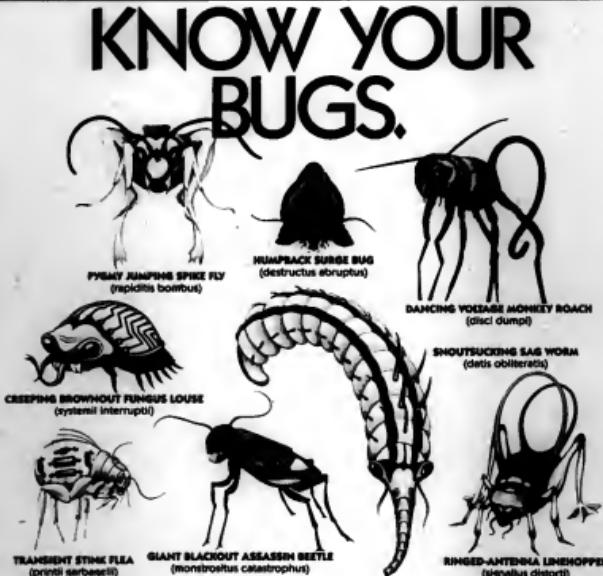
Through the agreement, the firms said, users will be able to send chart files to Autographix Imaging Centers in several major cities via a modem or floppy disk and receive slides or transparencies back in less than 24 hours.

The new relationship will provide users with two major advantages, according to Wesley Richards, Software Publishing's vice-president of marketing sales.

"First, our users get the highest possible visual fidelity between a chart as displayed on the screen and the slide made from the chart," Richards said. "Second, users can create slides automatically, without any cumbersome and time-consuming installation or file conversion procedures."

Richards contend that the production of slides with high visual fidelity had been a long-standing problem for personal computer-generated slides, which did not always match what was created on screen.

The firms stated that the service will be available to U.S. customers beginning in June. Customers can send chart files to centers in New York, Boston, Chicago and Los Angeles. Other centers will be opened in Canada, Europe and Australia a month after the service is available in the U.S.



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# NETWORKING

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Elisabeth Horwitt

## Pity pioneers of standards



We are all tired of vendors telling us that they will "absolutely, positively" support various industry standards "as soon as they have been firm'd up."

Sounds like a marketing play, cynical observers — myself included — have sneered. Easy enough to promise support when you know the protocols won't be ready for another year or two or three.

But I've changed my tune. I am now convinced that most major computer companies really are trying their best to follow the standards path because they have accepted that their customers won't put up any longer with all-proprietary solutions. If their efforts are slow and at times ineffectual, they are to be pitied more than censured.

The path to true standardization remains muddy, rocky and full of forks that lead to dead ends.

· Hewlett-Packard, Wang and Data General have clearly adopted an "if they hand you a lemon, make lemonade" approach. They can't keep IBM and DEC off their customer premises, so they are making a selling point out of their superior ability to link up with their rivals' products. But this strategy requires them to stay in the vanguard when it comes to implementing popular networking protocols — and it's not always easy.

Continued on page 75

## Linked PCs deliver newspaper

Distributed LAN brings expandability, sanity to beleaguered daily

BY ALAN J. RYAN  
CW STAFF

FRAMINGHAM, Mass. — Insufficient memory and a system that crashed eight to 10 times a day were unbearable, but *The Middlesex News* managed to plug along and get the paper published.

As time went by, however, meeting news deadlines became a nightmare as reporters competed for open terminals and new terminals, since the aging computer system could no longer be updated. The 4,000-circulation daily newspaper either had to stop growing or adopt an alternative system.

In response to this problem,

the newspaper's management formed a team that began a months-long search to replace the more than 10-year-old ECRM, Inc. publishing system. The patched and repatched system boasted a Digital Equipment Corp. mainframe at its heart that was replaced with a distributed network of personal computers, according to Eric D. Bauer, director of editorial operations.

Bauer said many minicomputer-based alternatives were explored, but the project team was leery of any system that could crash, bringing down all of the reporters and editors as well as the advertising department, while also cutting off access to

news wire capture services like The Associated Press and United Press International.

With a distributed PC network, "There's no CPU to crash across the network," Bauer said. "Individual terminals could crash, but as a system it wouldn't crash, so it's more reliable."

The chosen system, implemented Feb. 29, was pieced together by Information International, Inc., in Culver City, Calif., a supplier of newspaper and magazine publishing systems that features Teal/Publishing software developed by Morris Publishing Co. in Augusta, Ga.

The main CPU on each desk top is a generic 8-MHz, 40M-

Continued on page 74

## Users extol Microsoft LAN plans

BY KATHY CHIN LEONG  
CW STAFF

SAN FRANCISCO — Corporate users who attended the recent Microsoft Advanced Network Development Conference gave a strong thumbs-up to Microsoft's OS/2 LAN Manager, which has so far been endorsed by more than 20 software and hardware vendors.

Although network managers at the conference said it is still too early to make any commitments to the LAN Manager, they agreed with Microsoft's strategy to have the network program adhere to standard communications protocols such as Transmission Control Protocol/Internet Protocol, IBM's Netbeui and the ISO's Open Systems Interconnect.

Users also lauded the multitasking features the LAN Manager will provide as a result of its ties to OS/2. "LAN Manager appears too tightly coupled to OS/2 for users to ignore it," a user from a major power utility said.

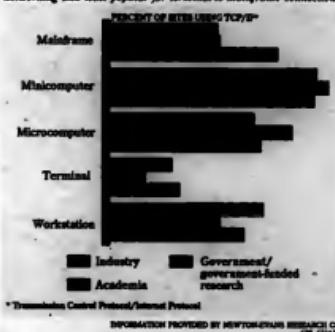
The conference drew a broad array of vendors, but approximately 12 users also attended the three-day forum, ranging from network novices to managers, all thirsty for concrete information. The companies represented in-

Continued on page 75

## Data View

TCP/IP use

The de facto standard is proving most popular for minicomputer networking and least popular for terminal-to-mainframe connections



INFORMATION PROVIDED BY NEWTON-EATON RESEARCH CO.

## Tapestry gets turbocharged

BY PATRICIA KEEFE  
CW STAFF

REDWOOD CITY, Calif. — Torus Systems, Inc. recently unveiled the second generation of its Tapestry network operating system, and to support Microsoft Corp.'s MS-DOS, OS/2, IBM's Netbios and the Server Message Block (SMB) protocols.

Tapestry II is targeted at large, multisite networks and features domain network and time management systems.

Torus is licensing the Microsoft Networks redirector for DOS networks and the OS/2 LAN Manager redirector for OS/2 networks for incorporation into Tapestry II. The software reportedly will let the two environments communicate freely.

Continued on page 74

## Inside

- Illinois Bell files ISDN tariff structure. Page 72.
- DEC, DSC agree to start telecom platform. Page 73.
- Ricc Data expands local fiber-optic line. Page 76.

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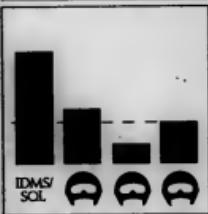
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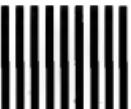
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## BIT BLAST

## Telecom service areas heating up

"ISDN Newsletter" said it has just published a copy of the nation's first Integrated Services Digital Network (ISDN) tariff structure, which was filed with the Illinois Commerce Commission March 29 by Ameritech's Illinois Bell. This four-page report, which includes a summary of Ameritech's introductory ISDN systems to business users, is available free by writing on company letterhead to Information Gatekeepers, Inc. in Boston.

**Bell Communications Research Corp.** (Bellcore) said it will present a proposal for a network traffic management operations system to be used by the former Bell operating companies. As new network architectures and services are introduced, the system is needed to manage network traffic on an integrated basis, according to Bellcore.

A Technology Requirements Industry Forum will be held this week at the Adam's Mark in St. Louis to discuss Bellcore's proposed generic requirements for the operations system and network element interface.

Voice-messaging services were targeted by Southwestern Bell Telephone Co. in its Comparably Efficient Interconnection (CEI) plan, which was filed April 1.

This marks the company's initial entry into enhanced services opportunities allowed under the March 7 ruling on the Modified Final Judgment information services ban. The CEI plans specifically target voice mail and telephone answering services. Field trials in those applications are slated to begin this summer and will consist of limited offerings in selected wire centers within Southwestern Bell's five-state service area.

**Avant! Communications Corp.** has signed a letter of intent with a subsidiary of Bell Atlantic Corp. to jointly develop a general-purpose carrier-based network management system that reportedly will enable users to merge and manage public and private network services.

Bell Atlantic will be able to use Avant!'s Open Network Management system as a base platform for its future expanded system. The vendors claimed their joint project will be the first system to support equipment from multiple vendors and multiple products such as multiplexers, central offices and private branch exchanges. Third parties are encouraged to enter the development process and can contact Avant!'s vice-president of marketing, George R. Kushin.

**McDonnell Douglas Computer Systems Co.** has certified its Material Management System (MMS) to be compatible with its EDINet communications network. The MMS/EDI certified package complies with the ANSI X.12 standard and will al-

low professional buyers of health care products to electronically transmit purchase orders to multiple health care suppliers. Currently, purchase order transactions are handled by phone or electronically transmitted to a single supplier.

McDonnell Douglas said it plans to certify its system with the electronic data interchange networks of competing companies.

**Synoptics Communications, Inc.**'s Lattisnet has been certified to run on Northern Telecom, Inc.'s Integrated Building Distribution Network cabling system. Lattisnet is an imple-

mentation of 10M bit/sec. Ethernet that runs over unshielded twisted-pair.

In addition, Synoptics announced that Bell Canada Enterprise, Inc. will be distributing the network as a key element of its Landscape general-purpose local-area network products.

**Micom Systems, Inc.** has in-

stalled its 3,500th data private branch exchange, at Anheuser-Busch.

**Digital Communications Associates, Inc.** (DCA) announced that Siemens AG will market its System 9000 T1 network processors on an international basis. In return, Siemens has granted DCA the rights to distribute its packet-switching

products and utilize this technology in future DCA products. In addition, the two companies plan to jointly develop Integrated Services Digital Network interfaces for the System 9000.

In a little more than two years of operation, GE Information Services has signed up its 100,000th subscriber, claiming to be the second largest service

provider in the on-line information services business.

**Joiner Associates, Inc.** in Madison, Wis., developer of Jnet IBM-to-Digital Equipment Corp. connectivity products, has been selected by IBM to assist in the national marketing and installation of IBM mid-range products under IBM's Industry Marketing Assistance Program.

## DEC inks telecom pact

BY PATRICIA KEEFE  
CW STAFF

**MAYNARD, Mass.** — Digital Equipment Corp. and DSC Communications Corp., in Dallas have announced an agreement to establish a technical platform for a line of telecommunications net-

work products for sale to equipment suppliers of the divested Bell operating companies.

The announcement is probably of more interest to customers of the former Bell operating companies than to DEC networking customers, conceded DEC spokesman.

"We are in the very early stages of studying ISDN [Integrated Services Digital Network] and intelligent networks," the spokesman said, adding that DEC hopes to sell VAXs and other computing engines to telecommunications equipment suppliers.

The nonexclusive pact reportedly will apply DSC's strength in telecommunications and DEC's strength in computer networks to the development of a series of products designed to "aid the provisioning" of services in the intelligent network.

Specific terms of the agreement were not disclosed. However, the two companies said that early efforts may be compatible with DSC's Megashub, a multifunctional network node.

According to the two vendors, other areas of potential Megashub applications include the following:

- Common channel signaling products.
- Computer-controlled switching applications to link telecommunications and digital computer networks.
- ISDN-related applications for voice and data networks.
- Advanced applications for value-added network services.
- Network management and operations support systems.

DEC announced a similar relationship with Siemens AG in March, the spokesman said, adding that it is unlikely any products will result from either alliance this year. Also, a communications development pact was announced with Apple Computer, Inc. earlier this year, but details will not be available until August.

"All these words don't tell me anything," complained Thomas White, president of Infometrics, Inc., a market research group in Santa Clara, Calif. "Companies have to stop this stuff. There's got to be a point where they stop sending press releases and start shipping products."

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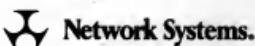
But the new Network Systems' TCP/IP product family offers relief from inherent Ethernet limitations. The IP Router opens a gateway between Ethernets and Network Systems' high-performance HYPERchannel® network, allowing users to tap the computational power needed to solve complex problems. In addition, a new group of HYPERchannel Bridges and Links reduces overloading on Ethernet networks, giving them the ability to reach resources anywhere in their global network.

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## Turbocharged

CONTINUED FROM PAGE 69

The program can retain and extend the icon-based user interface and functions — such as electronic mail, file management and telephone directory management — of its Tapestry predecessor, Torus said.

Tapestry II is Torus's platform for supporting the unreleased LAN Manager's interprocess communications and IBM's LAN Server. OS/2 is supported on both the server and workstation sides.

To enable users to integrate their networks a wide array of third-party products, such as specialized servers providing fault tolerance, Tapestry II will

support any SMB file or print server and any NetBios gateway or interconnect bridge, regardless of the manufacturer, the vendor claimed.

To allow networks of unlimited size to be efficiently controlled, Torus has introduced domain network management. Domains are logical rather than physical groupings of personal computers and can be used to reflect the organizational structure of a company. Domains may be managed from any authorized network node.

The domain configuration reportedly allows network details, including user details such as user name, password and privilege; and it allows node details, such as workstation hardware and operating system, to be specified and edited.

Internetworking is supported through NetBios interconnect bridges, such as Torus's recently announced CCITT X.25 Interconnect Bridge, which links Tapestry II domains over X.25 packet-switched networks or leased lines.

Further, new versions of Torus's Remote Network Link and Remote Access Gateway for Tapestry II will allow users to access a network across telephone wire, according to the company.

Also introduced was an E-mail system that supports communications of text and other data among users at single or multiple sites. A specialized server supports and manages the E-mail system to maximize performance and efficiency, Torus said. The mail-server management facilities enable a manager to clean up the mail

system by checking the status of messages or discard them.

Tapestry Version 1.0E, scheduled to ship May 1, is a preliminary version that allows customers to install, use and evaluate the network prior to final release.

However, the product does not include OS/2 support, is not appropriate for use on Intel Corp. 80386- and 80486-based PCs and does not provide integrated communications facilities.

It is free of charge on a 60-day evaluation and return basis.

Tapestry II Version 1.0 is the final release and is slated to ship in the third quarter. Pricing starts at \$695 for the Domain Manager Pack and ranges from \$395 to \$12,500 for Extension Packs, depending on configuration.

## Linked PCs

CONTINUED FROM PAGE 69

byte hard-disk system based on Intel Corp.'s 80286 chip. The distributed system, which also features an IBM Enhanced Graphics Adapter-compatible Amdek Corp. color monitor for each user and a 1.2M-byte, 5.25-in. floppy drive, is networked using Proteon, Inc.'s ProNet 10 10M-bit token-ring network.

Bauer said the system is readily expandable. With the ECRM system, the terminals were proprietary. Once the company went out of business, the terminals became harder and harder to find.

The Information International system allows the editors to converse more easily with bureaus locations. Reporters had previously been using Tandy Corp. Radio Shack Model 100 portables. The new system provides the bureaus with two-way communications access to the home office.

"This is the first piece of what will be a multiyear effort, called the integrated text processing system project," Bauer said. "We want a totally integrated, totally electronic pressroom operation." The company also plans to install a classified advertising system, an advertising make-up system and an editorial pagination system.

The system has no central data base, but there is a designated master station to which only editors have access and which allows them to work on stories for the next day's paper.

From the user perspective, there were drawbacks to the PC-based system, Bauer said. Because there is no distributed data base, reporters do not have access to other queues as they did previously. And, although the system offers many benefits, the additional features have made it more complex.

In order to ease the transition from the "elegant simple" old system, the company held a series of classes followed by a six-month period in which users could tinker with the new system while still relying on the old.

Still, when the day arrived to complete the transition, problems arose. Fortunately, it took place on a Sunday evening, the paper's easiest night. "We had a pretty tough night," Bauer admitted, "but there were no problems with the system. Some people were slow, but on the second day we saw a dramatic improvement." After several weeks in place, the paper is back to full speed, Bauer said. This time, though, there are no crashes waiting in the wings.

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## LAN plans

CONTINUED FROM PAGE 68

cluded Bechtel Corp., A. C. Nielsen Corp., Chevron Corp., Atlantic Richfield Co., (Arco) and United Airlines.

Microsoft has stated repeatedly that the LAN Manager will be available to users through OEM channels.

This means interested users will have to wait until many of the products demonstrated at the show are commercially available.

At least one user said he expects to adopt the LAN Manager sometime within the next six months. Marty Wilcox, MIS director at the Kansas Turnpike Authority in Wichita, has already purchased the

Microsoft Software Developer's Toolkit to develop in-house OS/2 applications for auditing and other tasks.

"We don't have any local-area network now, but I would think that we would use the LAN Manager to do some simple things like file and printer sharing. Having the multitasking environment of OS/2 at the server level will be very useful for us," Wilcox said.

"We are committed to LAN Manager," said Alan Brittnier, manager of systems services at Arco in Los Angeles. The company is currently using 3Com Corp.'s 3+ network operating system throughout its headquarters and plans to move to the next generation, 3+ Open, which is based on the LAN Manager and is supposed to ship in June.

"By using 3+ Open, we will be able to have better security and network management features," Brittnier said.

At Bechtel, the product will have a tougher time passing through top management. According to one anonymous user, "We are running Novell Inc.'s Netware over most of our networks — token-ring, Starlan and Ethernet. Getting LAN Manager in here is more of a political question."

Analysts tracking the market said the LAN Manager is on its way to success. "Even though it isn't out in the hands of users yet, there is going to be a snowball effect," predicted Brad Baldwin, an analyst at Dataquest, Inc. in San Jose, Calif. "Users are anxious to see what it will finally look like."

## Horwitt

CONTINUED FROM PAGE 69

to figure out ahead of time which protocols are going to be popular and what their final form will be.

The problems arise with the higher level protocols that define network access, such as distributed data base access, micro-to-mainframe communications and network management.

### To connect or not to connect?

IBM and the International Standards Organization (ISO) are still working on those problems, leaving would-be supporters with a dilemma: If they hold off implementing a potential standard until it is better defined, they can risk falling behind competitors in the race to provide multivendor compatibility. But should they connect too quickly, they could end up wasting a lot of time and money linking products to protocols that will eventually fall by the wayside.

Computer companies also have to figure out which protocols will become the norm for linking IBM microcomputers to host systems.

One less clear are vendors' plans for providing links between their own hosts and IBM Personal Systems. The problem, shared by most networking and computer companies, is figuring out whether to support IBM's Communications Manager and LAN Server or Microsoft Corp.'s OS/2 LAN Manager — or both strategies.

Then there is the network management dilemma. HP recently came out with such a system; DG promises to have one soon. They are also being pressured to support the ISO's Open Systems Interconnect (OSI), as the most likely multivendor networking standard, and Netview, because it is IBM's.

Although few users have current plans to manage their HP, DEC or DG installations through Netview, "They are asking us to support it because they are not sure that they won't want it someday," comments HP spokesman Bernard Guidot.

### Go figure

DEC's position is hardest to figure. It fervently claims to be moving toward true OSI conformance, but such a move seems against DEC's interests, given the age-old industry adage that "standardization benefits the underdog." The "it" in "Digital has it now" mostly refers to DEC's proprietary networking architecture, Decnet, which DEC claims is better than anyone else's — most definitely including IBM's.

Industry sources expect DEC to provide sufficient OSI support to allow other vendors to communicate with its systems but to continue offering extra features on Decnet, which will not be available through the OSI connection. This is probably the best compromise for DEC to make — given that it is not IBM.

IBM is the only vendor that doesn't seem to be floundering in the standards swamp; it is the only company that can impose its proprietary networking protocols on the world. Of course, the big guy has had to make a few concessions to the standards movement — but only when user demand reaches a certain level.

**Horwitt is a Computerworld senior editor, networking.**



## NEW PRODUCTS

**Local-area network hardware**

Bicc Data Networks, Inc. has added four products to its Isolan fiber-optic networking line.

The Isolan 1180 fiber-optic transceiver provides the connection from a workstation or a computer-interface board to a fiber-optic network. The Isolan 1150 fiber-optic repeater joins two copper segments with a fiber-optic link. The Isolan 1126 fiber-optic multipoint repeater connects several network segments in a 10M bit/sec. local-area net-

work. The Isolan 1160 fiber-optic hub allows the interconnection of numerous fiber-optic segments by forming a central fiber-optic hub in a star-shaped LAN.

The Isolan 1180 costs \$595; the 1150 costs \$1,995; the 1126 costs \$6,800; and the 1160 costs \$4,750.

Bicc Data Networks, 1800 W. Park Drive, Westboro, Mass. 01581. 617-894-2422.

**Network management**

Rabbitscript, a language interpreter that enables users to write interface pro-

grams for the Rabbitgate local-area network gateway and Rabbitstation 3270 terminal-emulation products, has been announced by Rabbit Software Corp.

Rabbitscript automates operator tasks involving any sessions or features, including data entry, watching for screen updates and transferring data to or from sessions and local personal computer files.

Other features include use of all IBM 3270 and PC keys, access to all data in host and local sessions, control of multiple sessions, file I/O, windowing control and handling of host busy and host wait.

Rabbitscript is included in Rabbitstation or can be ordered as an option for Rabbitgate for \$150 per workstation.

Rabbit Software, 7 Great Valley Pkwy. E., Malvern, Pa. 19355. 215-647-0440.

**Links**

Cross network and parallel link capabilities have been announced by NTX Communications Corp. for its IBM Systems Network Architecture (SNA)-based networking products.

The Cross Network Facility, or XNF, allows applications and subsystems to transfer data at T1 speeds between independent SNA networks. XNF is used in conjunction with the NTX 3800 Communications Processor, a front end that attaches multiple T1 links in a point-to-point or multi-point configuration.

Parallel Link Support (PLS) for the NTX 3800 Communications Processor permits multiple T1 links to be run in parallel between a single pair of host computers.

XNF and PLS are available as enhancements to the NTX Cross Domain Control Program for a license fee of \$200 per month.

NTX, 508 Tasman Drive, Sunnyvale, Calif. 94089. 408-747-1444.

**Modems/Multiplexers**

A V.22 modem capable of achieving an effective throughput of 7.2K bit/sec. over standard dial-up telephone lines has been announced by Microcom, Inc.

The AX/2472 employs Microcom Networking Protocol (MNP) Class 7, featuring enhanced data compression.

The AX/2472 also supports CCITT V.22 bis, V.22, AT&T 212A and 103, MNP Classes 1 through 4, the Hayes Computer Products, Inc. AT command set and the Microcom SX command set.

Features include automatic line equalization, automatic fall-back, autodial, redial, autosmear and support of asynchronous and synchronous data.

Offered in stand-alone and rack-mount models, the AX/2472 is priced at \$399.

Microcom, 1400 Providence Highway, Norwood, Mass. 02062. 617-762-9310.

An eight-port very large-scale integration-based multiplexer for connecting IBM-compatible 3270 terminals and printers has been announced by Intelligent Information Systems, Inc.

Called the IS-399, the multiplexer is compatible with IBM's 3299 Model 2 and 3 multiplexers and connects to the vendor's IS-374R communications controller or the IBM 3274 cluster controller via single coaxial or twisted-pair cable.

The IS-399 is priced at \$399. Intelligent Information Systems, Inc., 92 Kansas St., Hackensack, N.J. 07601. 201-343-8353.

Two 19.2K bit/sec. trellis-coded leased-line modems were recently announced by Anderson Jacobson, Inc.

The AJ 1911-L and the AJ 1911-LD provide synchronous operation over conditioned leased lines and feature automatic fall-back and fail-forward to speeds of 16.8K, 14.4K, 12K and 9.6K bit/sec.

The two modems are identical; the distinction being that the AJ 1911-LD features unattended automatic-dial backup capabilities.

Other features include a built-in two-channel multiplexer, a front panel control and self-diagnostic.

The AJ 1911-L costs \$4,995, and the AJ 1911-LD is priced at \$5,595.

Anderson Jacobson, 521 Charcot Ave., San Jose, Calif. 95131. 408-435-8520.

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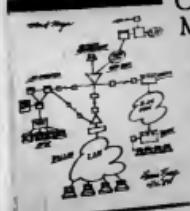


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# SYSTEMS & PERIPHERALS

## HARD TALK

Stanley Gibson

### WORMs may outlive us all



How do you squash a worm? Most people have committed what they call act so many times they do it without a second thought.

For vendors of write-once read-many (WORM) optical storage devices, the question of destroying WORMs is similarly given little attention. But it probably should be given more.

WORM vendors and users are so wrapped up in making WORM media resistant to potentially destructive forces that they have apparently ignored what they will have to do when the data contained on the disks is no longer valuable. Indeed, the problem of WORM elimination is something that vendors and data center managers will have to face someday.

At the recent rollout of DEC's WORM drive, the RV-20, DEC's marketing people devised the gimmick of serving pastries on the 12-in. optical platters. Once the press corps had consumed the delicacies, the disks were wiped clean, fed into a WORM drive and read by a computer system. The procedure, having no doubt been rehearsed a few times, came off without a hitch.

But if one believes all the

*Continued on page 84*

### Multihead monster draws stares

*Stellar announcement sparks multiuser superworkstation debate*

BY ALAN J. RYAN  
CW STAFF

Another species will likely make its way into the increasingly populated workstation kingdom: the multihead superworkstation. Such a system would reduce the cost per seat of supercomputers, but many vendors say the need for the multihead unit is low.

The category came to life when Stellar Computer, Inc. Chairman and Chief Executive Officer John William Poduska announced his company's intent to deliver a multihead version of its

recently announced Graphics Supercomputer Model GS1000 [CW, March 21].

Adding users to the traditionally single-user workstation is not an entirely new concept. Many companies, including Stellar, network their products as front ends to larger supercomputers, but many vendors say the need for the multihead unit is low.

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cause it would reportedly allow users to share applications through one workstation with multiple heads.

Stellar declined further comment on the future product, saying the company does not want "to set any market expectations." Some say, however, that a multihead workstation runs counter to the intent of workstation computing.

"In a way, it defeats the concept of a workstation. You're sharing, and that's a problem intrinsically," said Vicki Brown, an analyst at Framingham, Mass.

*Continued on page 85*

### Filenet links PCs, fax server

BY ALAN ALPER  
CW STAFF

NEW YORK — Filenet Corp. recently widened its distributed processing architecture by introducing a file server to ease document and image transmission between facsimile machines and workstations.

The facsimile server consists of an Intel Corp. 80386 processor, a network interface and a subset of Filenet's Image Access Facility (IAF) networking software. IAF provides remote access to Filenet's optical disk-based storage and retrieval system running its proprietary image and data processing software, World.

Once received by the Filenet system, documents can be automatically indexed using an Oracle Corp. database management system and permanently stored on optical disk. Users can then view the electronically transmitted documents from workstations.

Requests to transmit documents

*Continued on page 85*

#### Inside

- Unix file gaps in two mainframe lines. Page 80.
- Gould streamlines record management system. Page 80.
- Spectragraphics adds graphics, communications system. Page 86.

### DISTRIBUTED DATA PROCESSING

#### Sharing the wealth

BY BARBARA SEHR  
SPECIAL TECW

T he users are winning.

More of them want power on the desk top, and they're getting it, as distributed data processing gains widespread MIS acceptance. Corporations are doing out data in a variety of ways over chartered processors, local-area networks and desktop processors.

But is distributed processing right for your company? Can you justify it, cost-wise and otherwise? Marty Gruhn, executive vice-president of The Sierra Group in Phoenix, contends that the application, not the amount of processing power needed by the user, should determine whether distributed

*Continued on page 81*

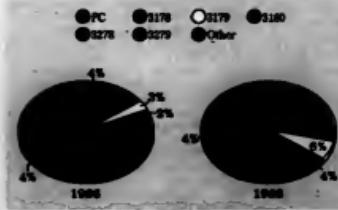


PETER PIETR

### Data View

#### PC chips away

IBM 3270 terminals still dominate mainframe shops, but IBM PCs are gaining



### User patient with IBM 3390 delay

BY STANLEY GIBSON  
and J.A. SAVAGE  
CW STAFF

IBM's announcement that advanced cache features for its 3390 storage controller will not be ready when the units ship in August has prompted speculation that the delay stems from IBM's desire to include features that will make the controller one of the building blocks for future architectures.

"So it's late. I am genuinely excited about the whole direction they are taking. The net benefit of the faster channel speed, the new disks and the controllers will outweigh the delay," said George DiNardo, ex-

ecutive vice-president at Mellon Bank NA in Pittsburgh. He said he understands that the controller, initially announced to support 4.5M bytes/sec., will eventually support 6M bytes/sec. channel speeds as well as fiber-optic channel transmissions.

"We really need these things in terms of saving time and effort," DiNardo added.

Bill Husband, senior consultant at the Morgan Group, a consulting and lobbying firm in Dallas, Ill., said he concurred with the view that IBM's delay is tied to the firm's intention to introduce features that will be part of future mainframe architectures.

The 3390 has advanced technology for advanced archi-

tectures that haven't been announced yet," he said. "The process of getting to those architectures is starting today." Like DiNardo, Husband said the controller will be able to handle the much-discussed fiber-optic channels that IBM is widely expected to add to its mainframe products.

Husband also said he believes a new direct-access storage device (DASD) will be shipped in the first quarter of 1989 and will be announced sometime this year.

The new disk, however, will have a fixed-block architecture that will make it necessary to change from the count-key data format that the 3380's sup-

*Continued on page 84*

## Unisys supplements disparate mainframe lines

BY STANLEY GIBSON  
CW STAFF

**C**arrying out its stated policy to enhance its two disparate computer architectures, Unisys Corp. recently filled gaps in each of its mainframe lines.

Unisys announced the Model 15 in its mid-range System 80 family, which is made up of former Sperry Corp. systems. The Model 15, performing at 1.5 million instructions per second (MIPS), fits between the Models 10 and 20 in the System 80 series.

Unisys also expanded its A 12 line of large-scale computer systems, adding the

A 12T to the former Burroughs Corp. systems.

The System 80 Model 15 is compatible with other members of the System 80 family, offering about 50% greater performance than the 1-MIPS System 80 Model 10. Slated for delivery in the fourth quarter, the basic system is priced at \$130,000.

Unisys also said it plans to introduce several common peripherals to support the System 80 Models 8, 10, 15 and 20, including a family of magnetic tape systems and a 1,200 line/min printer.

In addition, Unisys announced Fortran 77 and Pascal compilers for use with Sys-

tem 80 models.

The Unisys A 12T, offering 12.6-MIPS performance, is the most powerful of the three A 12 models offered by Unisys. Ranking below it in power are the A 12, announced in March 1986, at 8.4 MIPS, and the A 12E, capable of 5.4 MIPS. The A 12E was announced in November 1987. All three models are single-processor systems.

The A 12T was designed for high volumes of transaction processing in the price/performance range between the A 12 and the A 17, according to the vendor.

The A 12T is priced at \$1.9 million and is slated to be available in May.

## Gould polishes workstation

**F**ORT LAUDERDALE, Fla. — Gould, Inc.'s Federal Systems Division has streamlined its 1-year-old graphics and text Records Management Workstation for use in general storage and retrieval situations, offering a version that is slightly faster and allows for increased expansion.

The workstation was originally designed for the U.S. Patent Office with five boards and room for seven more, according to the company. The new version has two boards, allowing for greater expansion. The single workstation price is \$50,000.

The advantage of the workstation is that it can compress and decompress images, leading to an increase in speed, the company claimed. Accordingly, the decompressor can deliver 20M pixels/sec. to the screen, allowing the workstation to display a new page in less than 0.7 seconds. The patent office version was clocked at one page in 0.8 seconds.

### Uses less storage space

"Compression takes advantage of an area in an image, either in a graphic or photograph, which is the same shade. It stores repetition rather than the image, which reduces storage requirements. Instead of using one megabyte, it gets down to 100,000 bytes or less," a spokesman said.

The workstation comes with 4M bytes of main memory and 330M bytes of disk storage.

Gould said the boards execute a real-time executive, Paus, which is separate from the workstation's Unix operating system. Paus off-loads computing power from the main processor to the system.

## Rexon expands for VAR market

**C**ULVER CITY, Calif. — A general data processing system that can support up to 32 users and is field-upgradable to support 128 users is now available from Rexon Business Machines Corp., a division of Rexon, Inc.

The Summit 3000 is aimed at businesses that want future expansion capability, according to a Rexon spokesman. Both the new Model 3000 and Rexon's larger, older Summit 4000 are based on the 16-MHz Intel Corp. 80386 processor.

Both systems are sold only through value-added resellers and OEMs. The average dealer price for a Summit 3000 is \$22,510, including 1M byte of memory, a 178M-byte small computer systems interface disk drive, a quarter-inch cartridge tape drive, eight serial ports and a 1.2M-byte diskette drive.

Upgrading the Summit 3000 to be equivalent with a Summit 4000 supporting up to 128 users entails the addition of a 32-bit VMEbus and a card cage for \$20,000. A Summit 4000 is priced at \$45,000.

A Summit 1000, for one to eight users, and a Summit 2000, for eight to 32 users, are also available but are nonupgradable desktop units, the spokesman said.

# UDS is chipping away at V.32 prices!



# Sharing

FROM PAGE 79

processing can be cost-justified for an MIS operation.

"It has to depend on what people are doing," she stresses, noting that some applications require infrequent use of mainframe data while others need to be updated almost constantly.

So what are people doing? Computerworld recently interviewed MIS professionals to find out where and how distributed processing succeeds — and where it doesn't.

## In the air

Deregulation — the force that scrambled schedules, put airline ticket prices on a permanent roller coaster and set up a series of geographic hubs at airports across the country — has pushed the commercial airline industry to embrace distributed processing. "Some requirements cannot be met by a single host," notes John Testa, director of product and system engineering at Covia Corp., the wholly owned data processing subsidiary of United Airlines.

Covia is responsible for running the 60,000 devices — dumb terminals, intelligent workstations, printers and ticket processing machines — that

and, at the same time, give them more local control.

The company also experienced a net drop in communica-



**The Sierra Group's Gruber**  
tions costs, although as Testa points out, that was not a primary motivation in the project.

## At a hospital

Health care facilities place another type of demand on processing power. At Atlanta's Grady Memorial Hospital, the nation's third largest, clustered processors help ensure access to critical medical information.

There, Henry Camp has developed a Digital Equipment Corp. Ultrix-based data base that holds more than six million patient records. Part of the hospital's Therese medical information system, the data base is dis-

tributed over four patients. Treatments in other cases can be recalled in seconds.

For such critical data, reliability is paramount. When a doctor dealing with an emergency requires instant access to a patient record, precious time can be lost if a processor fails. By having the data base distributed over several systems, another processor is always available with the information.

While that may sound like a fault-tolerant system, Camp says the performance available in the distributed system is far greater than that of a fault-tolerant system. "With a fault-tolerant system, the user gets 50% of the horsepower 100% of the time. In the distributed system, the user gets 100% of the horsepower 99.5% of the time."

## State social services

Although reducing strain on a host system and cutting costs are important, demand for local access to data by remote users remains a far more important factor in the establishment of a distributed system.

The State of Oregon, for example, has 47 branch offices that determine eligibility for social services. Each branch receives information from the central processing center in the state capital of Salem. Recently, a groundswell of demand arose from the field offices, which were looking for Salem to share its data base. There was little objection. "About 25% of the data we keep here has no value to the central office," says Carl McIntyre, manager of information systems for the state.

McIntyre says his MIS department took the lead in examining the role of the central office and what data should be shared through a statewide network. As for cost-justification, he says it was a matter of determining the capacity of the IBM 3090 mainframe against what it would cost to install IBM Systems Network Architecture nodes in the field offices. The network uses a fault-tolerant system from Tandem Computers, Inc., as a file server to IBM Personal Computer XT in the field offices.

With the network installed in only 18 of the field offices so far, McIntyre says it is too early to weigh the all the benefits — or headaches — caused by the new system.

## Can you support it?

Support is a major challenge when distributing DP. Some MIS departments may not have the expertise to handle the increased demands of users who have been given greater control over local processing. "Users may not know what MIS can handle," The Sierra Group's Gruber says. "This can open up a real Pandora's box."

At the University of Houston, as with many institutions of high-

er education, computers not only run the university but are also used as learning tools. There, the decision makers of tomorrow might be more willing to open a Pandora's box in hopes of deriving a positive learning experience.

To this end, the university recently decided to rebuild its computer system from scratch in order to "build a software base for the 90s," says James Johnson, the university's vice-president of computing. Johnson says the task has not been an easy one. The university's ambitious MIS group is developing its own data base management system, which will contain all pertinent student information and will need to be accessed from a variety of locations.

The 40,000-student, state-supported university is a natural candidate for distributed processing, with several remote campuses scattered throughout the metropolitan area that surround the sprawling central city campus.

Although scheduling classes

flexibility of getting maximum information into smaller systems. Indeed, MIS directors at traditional shops say it is counterproductive to bring their applica-



**The University of Houston's Johnson**

tions into a distributed environment.

That was the experience at Transamerica Insurance Co. in Los Angeles. Robert Livingston, vice-president of technical systems, says his company launched a move to distributed processing back as early as the mid-1970s. At the time, the company was developing its own applications programs.

Initially, 11 VAX series mini-computers were installed to handle the needs of the 27 geographically dispersed offices of the nationwide insurance company, connecting a combination of IBM and Compaq Computer Corp. personal computers and IBM 3270-type dumb terminals. Over time, however, the experiment did not generate the anticipated solutions.

As more packaged mainstream applications became available, the company's emphasis moved toward the purchase, rather than development, of programs. The applications that were available in the market primarily ran on IBM mainframe systems. Consequently, the campus network must be complex enough to handle the requirements of scientific research and students' electronic desktop publishing. "We [in university MIS management] just dispense information," Johnson says. The users "turn it into value."

The university keeps four VAX systems clustered at its main campus and an additional VAX at each remote campus, all running on a single high-bandwidth network via microwave transmission. The main network is DEC's D-Net and connects everything from Apple Computers, Inc., Macintoshes to IBM PCs to dumb terminals.

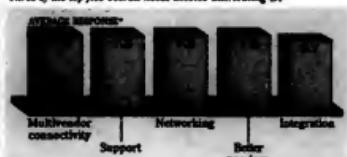
In addition, each remote campus has its own local-area network. The clustered system has been running since January, but there has been no review of its performance thus far.

## What it didn't work

Distributing data processing is not always the best solution. One factor that holds its implementation back in some cases is the dif-

## MIS concerns address distributed data processing

*Three of the top five overall needs involve distributing DP*



\*Takes from 1,000 respondents' comments rated with a 10, 8, or 6; the average was calculated by dividing the number of answers by the sum of the ratings for each category

INFORMATION PROVIDED BY THE SIERRA GROUP

schedule flights, log reservations and spit out tickets for the nation's largest domestic carrier. The nationwide network had been run from Unisys Corp. 1100/90 and IBM 90-series centralized mainframes until deregulation made this too complex.

At that point, Covia took a global look at its needs, Testa says, considering first its networking requirements and second the need for cost savings.

The network represented a major challenge, being the largest of its kind outside the federal government and the military. By moving to a distributed system, in which the computers in individual and international schedules are run on separate IBM hosts (from 4300 series machines to 3090s), Covia was able to satisfy user demands for more functionality

distributed over four DEC VAX 8550 systems and one VAX 8530. The network now supports 350 terminals of various brands and ultimately will connect up to 1,000 terminals.

"This is life-critical data," Camp says. "We cannot afford to have a data integrity problem."

Camp, now a vice-president of Medical Systems Development Corp., the spin-off company for the Therese project, set up a data base that holds 10G bytes of information, or approximately 320 million data items. The data includes approximately five million prescriptions, 600,000 radiology reports and 60,000 discharge abstracts.

The benefit of the system is that doctors can help diagnose an illness by cross-referencing the patient's symptoms with those

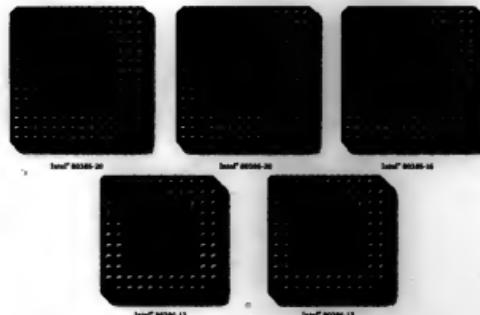
of other patients. Treatments in other cases can be recalled in seconds.

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At the University of Houston, as with many institutions of high-

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## Gibson

CONTINUED FROM PAGE 79

marketing promotion surrounding WORM drives, then the media will resist much more than mere pastry residue—admittedly a tall order for other media, such as magnetic tape. The disks are made of an alloy based on the element tellurium and are sealed with glass.

The whole point of the WORM media seems to be that long after Western civilization has vanished, WORMs will survive, impervious to the degradations of time. But while the WORM community is busy planning for eternity, it may be missing the obvious point that it is highly unlikely that data contained on WORM disks will be worth preserving beyond a span of about 30 years. That is, in fact, as long as DEC is willing to guarantee the integrity of its media.

After such a period of time, the data contained on the disks — insurance records, legal papers, construction blueprints and so on — will not serve a useful purpose. Should a building's blueprints be preserved when the building is no longer standing?

### Muddling society of WORMs

Hence, wherever is managing the data center decades from now will be faced with the job of getting rid of quantities of WORM media.

Even if the data contained on the disks is no longer valuable, it still may not be appropriate simply to toss the disks into a trash bin, where they could be stolen or curious individuals could gain access to possibly confidential data.

It would be nice to erase the disks and then recycle them. It would be a shame that the cover platters, sold for \$400 apiece by DEC and others, can't be reused over. But that idea runs counter to the very nature of the disks, exemplified by their name, write-once, read-many.

Physical destruction, I am told, is the way to get rid of the WORMs. But it seems there is no planned way to do this as yet. The best the WORM marketing people at DEC and elsewhere could come up with was talk about swinging a sledgehammer against the disks, or maybe ringing them like Friars against a concrete wall.

The goal of any of these operations would be to shatter the glass. But one marketing person mentioned that the glass on the DEC disks was believed to be bulletproof. Even if the glass did shatter, having an employee working in proximity to the glass splinters sounds like a good way to create a very poor workers' compensation record.

A safer but probably less effective method would be to perform a programming operation to conceal the disk's formats and, hence, their data. This would prevent the data from being accessed without some serious decoding being done. But a dedicated hacker would probably leap to the challenge.

Another response sounded like the best. Place the disk in an oven, heat it to 500 degrees Fahrenheit, and the data will be destroyed. Then the disk could be sent back to the foundry or tossed out. Come to think of it, wouldn't paper go up in smoke at 500 degrees? It looks like we're back where we started.

Paper, of course, is wisely recycled. There are also special incinerators, such as those used by the U.S. Department of

the Treasury in getting rid of tattered paper money. Maybe similar furnaces could be created for optical media.

One thing is certain. As WORMs come of age, finding a low-cost, safe and secure way to get rid of them in a timely and orderly manner is a need that all users of the devices will have to address.

At some point, the computing community will have to overcome its squeamishness and face head-on the question of WORM disposal. If we don't, archaeologists thousands of years from now will unearth our cities to find that our civilization did not collapse from decadence but from being overrun by WORMs.

**Gibson** is Computerworld's senior editor, systems & peripherals.

## User patient

CONTINUED FROM PAGE 79

port. "Inside the 3990 there has to be the capability to handle a new format of data," Husband said.

He also said the anticipated 3990 F models will probably feature 65M byte/sec. channels, which the 3990 will support.

Jim Porter, president of Disk/Trend, Inc. in Mountain View, Calif., said the IBM delay gives competitors such as National Advanced Systems, Memorex Corp. and other plug-compatible manufacturers (PCM) some technological breathing room.

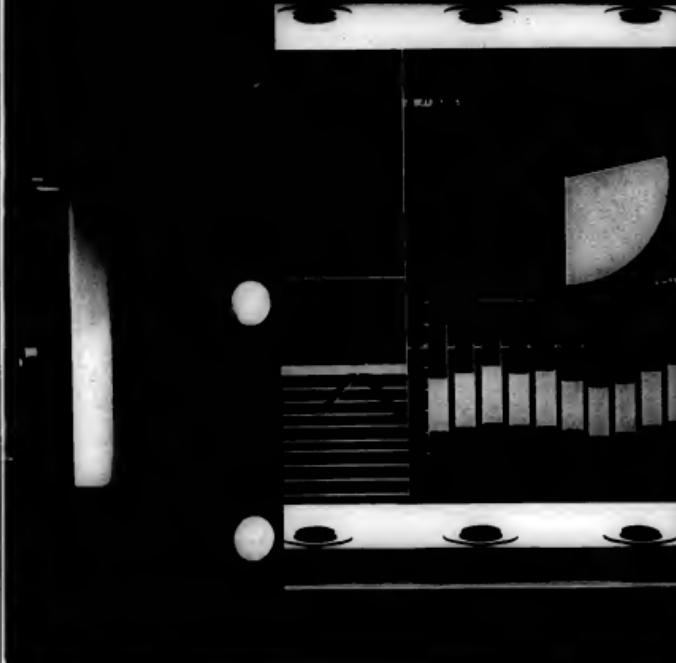
But, Porter cautioned, "they still don't have a clear running track. There is con-

cern over what IBM's underlying problem is. No one believes IBM's press release. They are looking for the Machiavellian scheme in White Plains. The simple thing is that they're late on the microcode, but no one believes that."

The PCMs themselves, however, showed little reaction to IBM's delay. Tracy Hawkey, project manager of large-system DASD at Memorex Telex in Milpitas, Calif., said his firm has not yet decided whether to emulate the 3990.

"We won't decide until a couple of months after we get our hands on it," Hawkey said. Memorex Telex's 6898 controller, which works with its 6890 DASD, emulates IBM's 3880 controller and 3380 DASD configuration, according to Hawkey.

## AT&T Power Protection Systems: Your best security against costly downtime.



## Multihed

CONTINUED FROM PAGE 79

based International Data Corp. (IDC).

"Most workstation users do not want a second or third user to affect their performance," said Arun Taneja, acting director of workstation division marketing at Sun Microsystems, Inc. in Mountain View, Calif.

"When you take a workstation and try to make it look like it can give you two equal performance levels for two individual users, that's asking for too much," Taneja added.

But there can also be benefits to the multihed machine, and Stellar, in taking a different tack from other superworksta-

tion vendors, may realize unique advantages, according to IDC's Brown.

By partitioning the units with more than one monitor, Stellar will significantly lower the cost per seat of its systems, making those computers more attractive to prospective buyers, Brown said. With just two or three users in each workstation, the units might become affordable to much larger numbers of firms, she suggested.

Pricing for the Graphics Supercomputer Model GS1000 starts at \$96,000 in its basic configuration with 16MB bytes of main memory. Configurations go up to 128MB bytes of main memory.

"Typical users doing interactive work could live very nicely with 64MB bytes each," Sun's Taneja said. "But bringing in hungry applications like finite element

analysis or large simulation may eat up memory quite rapidly, and there would be repercussions in terms of performance."

Although Stellar would not comment on how many heads it will put on a machine, most vendors and analysts speculated that the number would remain low.

**Forget the eight-hour workflow**

Most users rarely work at the workstation for eight hours a day, and sharing the resource could be helpful, Taneja said.

However, "if the first user is a heavy power user and uses the system for 20% of a given day, 80% of that day is still available, but the other user does not know when that 80% is available," Taneja said. Another use of a multihed machine, according to Taneja, is as a larger viewing

screen. He said some Sun customers have requested multiple monitors so they can view a large layout between the two screens at the same time.

Still, those contacted said taxing one system with multiple users would certainly show up at times.

With the multihed workstation, the degradation as users are added will be similar to that of a minisupercomputer, said Steven Gary Blank, vice-president of marketing at Ardent Computer Corp. in Sunnyvale, Calif.

**Sonos doesn't want to share**

Paul Beavis, product manager of high-end products at Chelmsford, Mass.-based Apollo Computer, Inc., illness the concept of multiple ASCII terminals working off of one workstation to time sharing. "The problem is sharing one CPU," he said.

Beavis said that because each user on the system would be allotted only a certain amount of time, the response time will lag proportionately as the number of users on the system.

Additionally, Beavis said, "the issue is distribution of computational resources. Each user has as much power as his wallet will allow him to purchase."

Blank said Ardent will continue to pursue its heterogeneous distributed network rather than consider multiprocessor versions of its supersupercomputers. "We have a number of customers interested in hooking up terminals and workstations through Ethernet or NFS, and it can be done today," he said. NFS is Sun's Network File System.

Beavis said that using the multihed approach could be less effective than using workstations networked to a server. "When I issue three or four print requests at once, the workstation doesn't have time to respond to my input anymore," he said. "If I had a server, I could put that on the server and let the server get bogged down while I continue to work. You've got to distribute the computing."

### Eliminate the cause of up to 50% of your computer downtime: power disturbances.

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AT&T's UPS is available in 1.3, 3, 5 and 10 kVA models.



The right choice.

## NEW PRODUCTS

## Processors

The S 40 desktop document processor has been announced by Unisys Corp.

Designed for use in automated payment processing applications, the S 40 reads, encodes

and encodes financial documents. It features four pockets, an audit-trail printer and an optional automatic document feeder. It can read several combinations of fonts and has a built-in processor and memory, the vendor said.

An entry-level system, in-

cluding one S 40, a Unisys B 26 workstation and a matrix printer, costs \$27,000. Additional S 40s cost about \$22,000 each.

Unisys, P.O. Box 500, Blue Bell, Pa. 19424, 313-972-9515.

## Graphics systems

Spectraphysics Corp. has added a graphics and communications system to its CommNet

workstation connectivity product family.

Called CommNet 1080, the system is said to implement full IBM 5080, Model 2A graphics and IBM 3270 alphanumeric capabilities in dynamic Digital Equipment Corp., VMS or Ultrix windows on a DEC Vaxstation. It also provides an IBM mainframe link, allowing Vaxstation users to access mainframe-based com-

puter-aided design and manufacturing applications programs directly from the Vaxstation.

CommNet 1080 includes a graphics and communication controller, a video interface module and window-control software. A basic system, including 1M byte of display list memory, 256-color support and documentation, costs \$9,900.

Spectraphysics, 9125 Rehco Road, San Diego, Calif. 92121, 619-450-0611.

## Terminals

A data terminal for use with Hewlett-Packard Co. computers has been announced by Houston Computer Services, Inc.

The terminal, called the Plus10 Model 92 CRT, is said to be compatible with HP's proprietary 2392A and 700/92 terminals. Features include a tilt-and-swivel display, a detached keyboard with HP-compatible keys and a printer port. It also includes 2392A character-mode and block-mode compatibility, a 14-in. display and choice of a green, white or amber display.

The Plus10 Model 92 costs \$699.

Houston Computer Services, Suite 200, 11001 S. Wilcrest, Houston, Texas 77099, 713-568-9900.

A coaxial IBM 3191 plug-compatible information display station with an integral bar-code reader has been announced by Term-Tronics, Inc.

The Miracle-191 II feature menu-selectable bar-code parameters and the ability to automatically discriminate among symbologies. According to the vendor, no external bonded power plug or hardware or software changes are required. Options such as a light pen and a separately addressable printer port providing IBM 3287-type printer emulation are available.

The Miracle-191 II costs \$1,995.

Term-Tronics, 4990 View Ridge Ave., San Diego, Calif. 92123, 619-565-6330.

## Printers/Plotters

A family of B-sin thermal-transfer color output devices has been announced by Calcomp, Inc.

Called Colorview, the family includes the Model 5612 printer, the Model 5912 plotter/printer and the Model 903 color video controller. The Model 903 interfaces to workstations with red-green-blue output and captures a screen image. It also supports the Calcomp Colormaster and Plotmaster plotters/printers. It is packaged with the Model 5612.

The 5612 and 5912 offer 200 dot/in. resolution. The 5912 costs \$9,995; the 5612 costs \$7,995; the 903 costs \$6,995.

Calcomp, 2411 W. La Palma Ave., Anaheim, Calif. 92801, 714-821-2142.

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## 2. Maximize Your Savings.

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## Your choice: Public or private electronic mail

*Consider all the factors — from privacy to costs to whether you'll be sending more than mail*

BY G. BERTON LATAMORE

**T**his year, U.S. offices will exchange an estimated two billion electronic mail messages. By 1991, that volume will grow to 8½ billion messages, and "by the year 2000, I can't imagine any businessperson not being as adept at using the telephone," says Walter Ulrich, electronic mail expert and partner at the consulting firm Coopers & Lybrand in Dallas.

By then, some 60 billion E-mail messages will originate in the U.S., barring some catastrophic economic or military disaster, Ulrich predicts. While some of these messages will replace phone calls, surface mail and facsimile messages, others represent new ways of communicating altogether, such as binary file transfer — the exchange of working files like spreadsheets, word processing files and parts of data bases.

Of these, Ulrich says he expects private systems — using off-the-shelf software such as IBM's Professional Office System (Profs) or Digital Equipment Corp.'s Vaxmail and running off-in-house hardware — will carry five-sixths of all messages by the year 2000. The other portion will run on a common carrier, such as a public packet-switched network. The question companies must ask is, Which way are the trends running, and which type of network will work best for us?

Most companies' initial expe-



DAVE JULY

rience with E-mail is on a common carrier. The reason is based on economics: If a company's E-mail volume is low, subscribing to a public system is cheaper than running a private one. As message volume grows, corporate management may begin to consider bringing such operations in-house.

The M. W. Kellogg Co., a Houston-based international engineering firm, makes heavy use of both private and public systems. According to David Lee, information center manager, "Theoretically, you can do anything on a private system that

you can on a public one."

In practice, however, public E-mail has a unique part to play in corporate communications. Ultimately, Ulrich argues, companies will need both public and private systems, just as they need both public and corporate telephone systems.

### 24-hour support

The largest costs of a private E-mail system are the hidden ones, according to Marilyn J. Bardsley, vice-president of marketing and business development at Dialcom, Inc. in Rockville, Md., one of the leading U.S. suppliers of

public E-mail.

Running electronic mail requires support for all corporate users — including technical professionals, power users and, on the other extreme, occasional users with no computer knowledge, Bardsley says. If the system is nationwide, someone has to be available at least from 9 a.m. Eastern Standard Time to 5 p.m. Pacific time each weekday. If the system is worldwide, it needs 24-hour support. That level of support may not be feasible for some companies.

Second, the system must be reliable. Corporate executives

Latamore is a free-lance writer based in Burlington, Vt.

### • Break-even costs of going to private E-mail

### • Public: Best for international mail

### • When security counts

will not tolerate an E-mail system that crashes any more than they will a private branch exchange that breaks down, Bardsey says.

Third, she says, the organization has to be ready to install upgrades as they become available — or in some cases develop its own to meet corporate needs.

According to Bardsey, the break-even point — when it is no more expensive to run your own system than to use a public one — usually arrives when the monthly E-mail bill reaches \$30,000 to \$40,000.

Obviously, Bardsey's angle on the matter is a public network vendor's. Ulrich disagrees with her figures but backs the gist of her analysis. "A company that's spending \$10,000 a month with an external service vendor to provide electronic mail between offices in a headquarters or other discrete site should clearly bring it in-house," he says. Often, he says, be may have a jump in mail volumes when his clients do so.

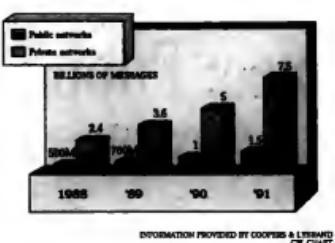
#### The bottom line

"There is an economic disincentive to using public electronic mail to [message] people in nearby offices," Ulrich says, and corporate executives who watch the bottom line are aware of that and set policy accordingly. "If it is going to cost your department 40 cents to send a message down there, you'll probably just walk down there. But if it costs only 3 cents, you'll probably use electronic mail."

Other issues, however, can make the choice less clear. If a company needs connections to many customers' suppliers' offices or for a large, mobile field sales or maintenance staff, public systems will probably be more practical because they offer almost universal local dial-up access through the public packet net-

"Sometimes we do have our field people dial directly into our internal VMEbus system over long-distance telephone lines," Kellogg's Lee says. "Sometimes our customers call into our system to

**Electronic mail growth spurt**  
Study, strong growth is predicted for traffic across both public and private networks, assuming there is no major stock market fallout



leave messages, too.

"On the other hand, we certainly don't want one of our field engineers dialing direct from a construction site in Australia to send us a long CAD file. It is much cheaper to use GE Information Services' network," he continues, referring to Quo-Com, which was developed by that division of General Electric Co. In addition, he says, for such a great distance, the connections are much more dependable over the Rockville-based common carrier than by telephone.

#### Out of your hands

However, when you use a public system, you lose some control, which may affect security. For instance, you trust the common carrier not to read your messages just as you trust the telephone company not to listen to your calls. In the U.S., that does not pose a problem. However, in some West European and Far Eastern countries — and in all Eastern bloc countries — the government-owned telephone company listens in on calls that cross national borders. These same agen-

cies run the national public E-mail systems.

Automatic backups are another issue — as Lt. Col. Oliver North found out. He sent incriminating messages through the Pentagon's Profs, thinking it was a good way to avoid having copies fall into the wrong hands. Those messages were backed up by the system and discovered by congressional investigators.

Both public and private systems make backups to ensure data in the case of a crash. For instance, Kellogg's Vmaxmail system automatically backs up all messages in storage at the end of each day. One of these backups is held for a week and one for a month. The end-of-year backup is held for a year.

Again, there are advantages and disadvantages to backups. A vice-president in a large corporation might send a message to corporate lawyers asking advice on a sensitive business negotiation. Taken out of context, the message might look like a request for instructions on how to legally — not a message anyone would want hanging around.

network line and then capture and identify all the packets of a particular message; it isn't impossible, but it's not really worth the trouble, either. It is also illegal, thanks to the Electronic Communications Privacy Act of 1986.

There are still other privacy concerns. For example, at Kellogg and many other companies, even the president uses E-mail. In fact, Lee says, it is often more private than other surface mail or telephone. Because electronic messages are less formal than letters, executives usually write them themselves rather than dictate them to secretaries. Because E-mail eliminates telephone tag and telephone interruptions, executives handle their own sending and receiving.

This directness does bother some top-level executives who prefer to have calls and mail screened by a secretary. "Our president has realized that anyone could send him an electronic mail message, and that worries him some," Lee says. "We heard the same thing from one of our clients — a major petroleum company. With electronic mail, anyone can get right to executives with messages that may waste their time."

#### Closer contact

One reason for choosing a common carrier over a private E-mail system is to keep in close touch with a large population of suppliers and customers scattered throughout a wide geographic area in an automated environment.

Continental Holding Co., a national food wholesaler in Covina, Calif., generates 4,000 to 5,000 messages at a cost of \$5,000 to \$6,000 a month. The service it uses is Easylink from Western Union Corp. in Upper Saddle River, N.J. Easylink allows Continental to handle \$300 million in food orders a year with only 120 employees, according to Capella, Continental's assistant director of MIS.

"The bulk of the messages are orders for product shipments to our approximately 1,000 suppliers — 'Send X number of cases to a customer or warehouse' — or orders to us from the odd-national retail grocers we sell to," Capella says. Many of these messages are computer generated.

A typical message sequence starts when one of Continental's customers places an order. "The order may involve anywhere from 10 to 50 different items," Capella says. "Some may be in our warehouse, but we may have to order some direct from the suppliers, many of whom are fairly small and specialize in one or two crops."

The order comes in via Easylink or over the phone and is fed into Continental's mainframe or an IBM 4381 Model 2, which consolidates it with other orders, determines the best source for each item and places the appropriate requests to Continental's suppliers via Easylink.

When products are shipped, the supplier sends back confirmations. The system then generates bills and sends them to customers. In many cases, nothing is printed on paper until the checks are cut. The next step will be

Continued on page 92

# Uptime

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# Leading E-mail contenders

Today, more than 50 public electronic mail companies compete for the U.S. market.

In terms of features, the leaders offer binary file transfer for sending working files, but they differ as to which connections they offer to facsimile machines and other communication networks.

When it comes to cost, pricing structures vary. For example, MCI Mail from MCI Communications Corp. incurs no minimum monthly standard fee, as it bases charges on message length. That makes it an excellent good choice for small companies and individual professionals whose usage volume is fairly low.

Most of the other services charge standard monthly subscription fees that can range up to several hundred dollars, but they charge little for actual usage. This makes those offerings more attractive for large companies that plan to be heavy users.

Following are a few products from the dozen or so companies: **Easylink.** Sold by Western Union Corp. in Upper Saddle River, N.J., Easylink is one of the easiest services to work with, although it may not be the easiest to learn. With only two screens, it uses confidence-inspiring icons. However, it gets in the way when auto-expanding messages, and Easylink makes that process particularly easy. The product provides connections to international and domestic telex and facsimile networks. It offers connections to domestic public services in several countries.

Easylink also provides access to more than 800 research databases.

**MCI Mail.** Sold by MCI Communications in Washington, D.C., MCI Mail is available as both a standard and an advanced service. The standard service provides full messaging and was designed for business users. MCI Mail offers connections to facsimile and other networks.

MCI Mail offers a direct connection to the Dow Jones News/Retrieval service and to domestic services in several other countries.

Unlike other services, MCI Mail originally identified small companies and individual professionals as its main market. It developed a unique pricing structure with a one-time sign-up fee of approximately \$10 and no monthly service charge, which makes it attractive to the market. However, MCI is willing to provide other pricing schedules to potential large customers.

**Dialcom.** Offered by Dialcom, Inc. ITT Corp. sold this Rockville, Md.-based company to British Telecommunications PLC, which runs Telecom Gold, the dominant E-mail service in

Great Britain. Dialcom is particularly proud of its electronic news service, which allows users to establish a list of preferred subject areas on which the service follows up, delivering news stories on those subjects to the user's mailbox as they arrive over the news wires.

Dialcom is particularly strong in international connections, mainly because the company has sold its software to the leading E-mail vendors in more than 30 countries.

• **Quik-Comm.** Sold by GE In-

formation Services, a division of General Electric Co. in Rockville, Md., Quik-Comm uses the international packet network gateways to provide interoffice communications for large corporate clients. It provides client gateway and off-the-shelf interfaces to IBM's Digital Office Support System, Professional Office System and Digital Equipment Corp.'s All-In-1. IBM Per-

sonal Computer-compatible and Apple Computer, Inc. Macintosh-compatible front ends are available.

GE Information Services tailors messaging capabilities on the network to customer applications. Quik-Comm can be configured with electronic data interchange-like features for large customers.

G. BERTON LATAMORE



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highway. Instead, we created a superhighway called Micro Channel architecture in Models 50, 60 and 80, a much more efficient method of sending and receiving information.

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## E-mail

FROM PAGE 88

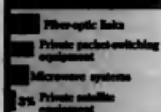
direct payment via electronic funds transfer.

Continental has been placing orders over Easylink for two years, and it has proved so efficient that the company now requires its suppliers to use electronic mail. Easylink is several times faster than the alternative method, TWX, Capella says. He says it took four to five hours to send a day's orders via TWX. Today, it takes less than two

### Private network facilities

*A survey of large businesses shows that faximile is their most often-used equipment*

#### PERCENT OF RESPONDENTS



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hours to upload all the day's orders, and because order handling can be automated, it is faster, easier, less expensive and more efficient. Although the system is highly automated, Capella distinguishes it from true electronic data interchange (EDI) because it lacks such characteristics as financial report features.

However, Capella says he foresees the day when Continental will attain full EDI functionality on Easylink. At that point, there will be no paper and no manual handling of routine ordering, billing and payment. In fact, Easylink now offers an EDI service because of the direction Continental and several other large customers have taken in their electronic mail usage.

### Across the seas

In general, public systems have a major role to play in international communications. Kellogg, for instance, has field offices equipped with personal computers at building sites worldwide. Communicating with these sites is vital to Kellogg, yet often hard to establish.

"It's nice to have someone with the clout GE Information Services has to help you get a communications system set up in foreign countries where you have different communications laws, government administrations and so forth," Lee says. "That's where GE has helped us a lot."

John M. Thorp, office automation specialist at Arthur D. Little, the Cambridge, Mass.-based consulting giant, agrees

that the public carriers are helpful in expediting international communications. With offices in cities worldwide and consultants constantly on the move, Little is concerned about efficient communications.

"I can dial a local number anywhere and get on Dialcom," Thorp says. "The main reason we picked Dialcom and stay with it exclusively is worldwide access."

Dialcom supplies the electronic mail software used by the dominant commercial carriers in several European companies, including West Germany and Great Britain. Sending a message to any other system may require knowing only the recipient's system ID and a three-letter, three-number address.

Little generates more than 1,000 messages a day, seven

days a week. "We have a big energy group in London, an energy group in Houston and an energy group at headquarters," Thorp says. "We often put people from all three together to do a report, and they work over electronic mail. We've almost eliminated facsimile, and we've avoided trips to London this way."

Little's usage goes beyond simple messaging. All the com-

pany's budgeting is done by using Lotus Development Corp.'s 1-2-3, and consultants exchange spreadsheets via E-mail. Recently, a pair of consultants in the U.S. and one in London put together a budget for a proposal in four hours over Dialcom, Thorp says. It used to take several weeks because of delays in international communications.

Of course, some private

# SQL Performance for OLTP. Tandem challenges anyone.

systems also support this feature. "Binary file transfer will definitely increase in importance to Little and to most large companies," Thorp says. "It will become a major reason that companies turn to electronic mail."

**Attitude switch**

Ulrich says he has detected a change in attitude toward E-mail in the last seven years. In 1981,

he recalls, most nontechnical executives among his clients were apprehensive about the technology and unwilling to use it.

By 1984, while most still had no personal experience and did not completely understand what it might do for them, Ulrich's clients were aware of E-mail through articles and ads in the business press. They recognized that they needed better business

communications and thought E-mail might answer their needs.

Ulrich attributes this change to education and particularly to newspaper articles. Before 1981, he says, the business press paid virtually no attention to the technology. Between 1981 and 1984, however, such magazines as *Forbes*, *Fortune* and *Business Week* regularly published articles on the poten-

tial business benefits of E-mail.

While this publicity created a receptive atmosphere, few nontechnical executives in 1984 actually used the services. Today, however, it is hard to find executives who do not already have electronic mailboxes, Ulrich says.

One difference is in the level of convenience. Most executives have PCs on their desks, so they

do not have to share terminals. Furthermore, the user interfaces of most services and software have improved, and terminal emulation software has been introduced for Microsoft Corp., MS-DOS and Apple Computer, Inc. Macintoshes.

#### Instead of the phone

At the same time, evidence of the hard business benefits of E-mail is appearing. Kellogg's Lee recently looked at E-mail as an alternative communications medium between Kellogg's Houston and London sites. This traffic

#### What do you want from a network?

402 business with annual sales of more than \$100 million share a few near-term objectives for communications

#### PERCENT OF RESPONSES



INFORMATION PROVIDED BY A MINT LANE RESOURCES COMPUTER SURVEY © MINT LANE

is handled by Vaxmail between DEC VAX-11/780 clusters in the two offices. Previously, the only alternative was the telephone.

"In November 1984, we generated a little over 23,000 messages on our internal system," Lee says. Of those, about 1,000 went outside the Houston office to other connected systems. Of that, 650 messages went to London. "We presume that half those London-bound messages displaced telephone calls," Lee says. "Our average call to London is a \$1.3 charge, and the savings between that cost and the average cost of sending a message via Vaxmail was enough to pay for our entire Vaxmail system. That's less than 3% of the messages on the system."

Ulrich observes, "In 1984, we were just finishing the beginning of the PC wave. Since then, people have lost their fear of keyboards, and the promotion has continued." Furthermore, the pilot tests of 1984 have developed into full-blown systems, and more companies are using electronic mail. This tends to validate the technology as a business tool in the eyes of many executives who do not yet use it themselves.

"Demand for electronic mail will become even stronger in the future, and the day is fast approaching when it will be as common as the phone," Ulrich says. \*

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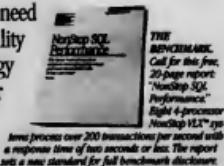
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## E-mail pros from an evangelist

Competition among vendors of electronic mail systems for the Apple Computer, Inc. Macintosh is heating up.

Inbox from the Think Technologies Division of Symantec Corp., holds a commanding share of today's market as the most popular E-mail server for Apple's Appletalk local-area network.

In addition, Microsoft Corp. recently purchased Internal, another Appletalk E-mail server, from Newton, Mass.-based Internet Systems Corp.

The company is marketing it as Microsoft Mail. Dynex Communications, located in Salt Lake City, and several other

vendors are also expected to jump in this year.

Andrew Singer, 45, is general manager and one of the founders of Think Technologies in Bedford, Mass.

Singer was instrumental in developing Inbox for Think Technologies, and he is particularly concerned with the human elements of interface design. He is also an E-mail evangelist.

Singer recently spoke with Alan Radding, a Boston-based free-lance writer.

**With the first X.400-compatible products being announced, has E-**

**mail's time finally arrived?**

People say 1984 was the year of the PC or that now we have the year of the network, but that isn't quite true. We never had a year of the PC. We did have the year of the spreadsheet and the year of the word processor. People are much more interested in the solution, not the machine.

The real question is, Why do we have networks? What is the application that really makes the network meaningful? The application is electronic mail.

**Andrew Singer**

lot of meetings.

**Have ease-of-use issues changed at all lately?**

There are two tiers to consider. First, there is ease of learning. It must be easy to learn to use, but that really just gets people in the door.

The second tier is that it must be convenient to use. We did a study that showed that an E-mail system typically handles an incredible number of small, 30-character messages. The user has to be able to send the message in a second. If it is faster to pick up the phone or scribble a message, people will do that.

E-mail is competing with facsimile, Federal Express and the phone — they're all competing for a person's mobility.

**Does E-mail also compete with voice mail?**

Voice mail is a feature of the phone system, and it will remain there until voice is easily transcribed to text.

Voice is like graphics. You can integrate it into the system, but it is not comprehended [by the system]. It is simply included.

I think people will experiment with multimedia E-mail, but I think it is years away.

**When will we see seamless, worldwide E-mail?**

Customers don't realize that this is a problem yet. E-mail is in its infancy. People are still using it for prearranged communications, not general communications.

It actually would be very surprising at this stage if all the E-mail systems were integrated.

**Is the time right for an international standard like X.400?**

There is a need for standards, but X.400 doesn't solve all the problems. Computer people like the idea of a single standard, but X.400 is really a good solution only for very large-scale E-mail applications. For most users, however, it is standards overkill. I've been talking to some vendors about a de facto standard for small applications right now.

**Your company plans to publish the inbox protocols in an effort to become the de facto standard. Do other vendors see the need for a standard right now?**

The customer wants something now. The trouble with standards is that they are trumpeted long before they are real.

**What will happen to the Macintosh E-mail market now that Microsoft is in?**

It's going to make it grow. We might lose some market share, but I can live with a smaller share of a much larger market. \*

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## Lack of unity endangers the promise of DAT

BY JAMES A. MARTIN  
CW STAFF

Although digital audio tape (DAT) is not available yet in the U.S. consumer marketplace, the news media is generating interest in the new data storage

DAT, or Data DAT (DAT), is industry insiders call it, promises capacity of up to 1.2 Gbytes and storage rates of up to 10M bytes/sec. This represents an improvement over current standard quarter-inch cartridge systems with 1.56G-byte capacity and a storage rate of 6M to

7M bytes/sec.

— BY MICHAEL KARASICK

## Storage Tech boosts solid-stateance:

BY JAMES CORNELL  
CW STAFF

Louisville, Colo. —

Storage Tech Corp. has

CodeX reveals net manager  
grated line of communication products

DB2 advantages require fast u se

Development benefits over IMS seen

BY MARC COCKE

Intel's Ready To  
Run Fast Pack,  
includes DB2

VS host links are first step on road

BY ELIZABETH BRONSTEIN  
CW STAFF

LOWELL, Mass. — In a move

to expand its

product line, Wang

takes Ethernet

plunge

MAP users

group lays

down law

BY MARV COHEN

ability gate license and on ver-

se, said Michael Goldstein,

co-president of computer and

hosting and information services

Continued on page 10

## Unisys adds 1100/90 models

Product line

BY STANLEY

BLUE BELL, Pa.

Unisys' desktop portion

Corp. of America

announced

the introduction

of two new

models

the 1100

and 90

systems

for the

workstation

market

and the

midrange

market

respectively.

The 1100

and 90

systems

will be designed to replace

existing Unisys

systems with

newer, more

powerful

systems.

BY ALAN ALPER  
AND ELIZABETH SCHWITZ

NEW YORK — AT&T has

announced plans for a mobile

communications system that

potentially would offer

lower prices, less in maintenance costs

and greater reliability

than existing cellular

systems.

The ordinance is expected

to take effect in early

1988, after a period of

public hearings.

AT&T said

the mobile

communications

system will be

able to provide

communications

between cellular

and other mobile

systems.

AT&T said

the mobile

communications

system will be

able to provide

AT&T spells out net contr

AT&T's plan to provide a mobile communications system that potentially would offer lower prices, less in maintenance costs

## NEC releases hard-disk Multispeed laptop

WOOD DALE, Ill. — A hard-disk drive

of its Multispeed IBM-compatible

laptop by next week by NEC

electronics reported

systems

AT&T's plan to provide a mobile communications system that potentially would offer lower prices, less in maintenance costs

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AT&T's plan to provide a mobile communications system

# Expert systems: Are you already behind?

*You can expect an explosion of knowledge-based systems fielded by your competitors in late 1989*

BY HENRY ERIC FIRDMAN

**C**orporations are quietly developing knowledge-based systems before making the big leap into commercial development. This is good news for many newcomers. If they can put together a well-planned, goal-oriented effort, they can even surpass the early birds that let their artificial intelligence capabilities grow in an exploratory, unstructured way.

Today, the number of fielded commercial AI applications in the U.S. is very small — in the low hundreds. Fielded applications refers to those developed by one group of people — knowledge-based designers — and used by another.

There is actually nothing surprising in this low number. According to a number of sources, the development cycle from inception to field use for a mid-size to large knowledge-based system ranges from two to four years. If this is so, we can expect a relatively large number of fielded knowledge-based systems to appear no earlier than late 1989 or 1990. However, this projection holds true only if developers always succeed with their first AI application, which is usually not the case.

In fact, most companies do not even intend to use their first application as a production system. They look at the first application more as an experimental

tool for training developers and then plan something more ambitious by the second or third product.

As a result, we can realistically expect the growth of fielded knowledge-based systems to explode in late 1989 or even 1990 (see chart page 100).

#### A passing phase?

Very few off-the-shelf commercial AI applications exist today. The question is whether knowledge-based technology is just a temporary phenomenon and how fast this segment of the AI market is going to grow. If it had grown quickly, many companies could have just waited for an off-the-shelf application to fit their needs instead of developing their own AI capabilities.

However, the real story is

more disappointing. There are reasons to believe that knowledge-based technology will not expand significantly. Looking at three major companies in this area — Applied Expert Systems, Inc. and Production Software, Inc., both in Cambridge, Mass., and Syntelligence, Inc. in Sunnyvale, Calif. — we can see why such growth is not expected:

- All three companies have extraordinary in-house AI expertise. Each employs two or three world-class AI professionals. Unfortunately, the number of such experts is limited, so the chances of seeing many new companies of this rank are pretty slim.

- None of the three companies trust commercially available knowledge-based systems development tools and have, instead,

developed proprietary tools. What is horrible from a software engineer's viewpoint is that these companies were developing the tools — and the applications written in the tools — simultaneously.

Where in conventional software development would you ever find someone developing an application program in Pascal and a Pascal compiler at the same time? It is forbidden, but not in the world of AI. Why can these companies do this? Just because of a tremendous level of expertise?

- All three companies develop well-defined vertical products and would like to sell them "as is." Unfortunately, this is not what customers want. Users want tools customized to their specific environments.

For example, the banking industry does not believe there is such a thing as a general-purpose lending adviser. Each bank follows idiosyncratic lending regulations and policies and wants these specialized requirements to be incorporated into the lending adviser.

Imagine a company like Syntelligence becoming so successful that it can sell 1,000 copies of its lending adviser product. Then it has to keep track of 1,000 different customizations of the same "generic" product — which is not so generic anymore. This is no trivial problem, and I'm not sure there is anybody in the world today who knows how to solve it.

To summarize, I believe two main factors — shortage of high-level AI expertise and the ad hoc nature of AI applications — will severely limit the growth of the market for off-the-shelf AI application products.

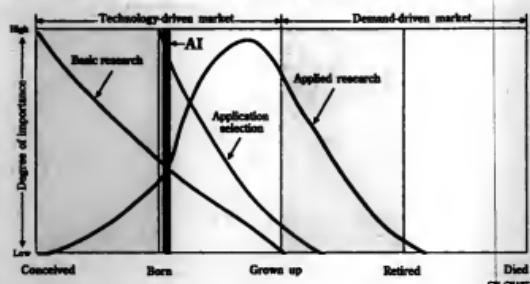
If I am right, we will see venture capitalists losing interest in AI, which would mark the first indication of market weakness in

Firdman is president of Henry Firdman & Associates, a Palo Alto, Calif.-based consulting firm specializing in AI. He is former director of the Artificial Intelligence Laboratory at the Russian Academy of Sciences. A longer version of this article appeared in the January issue of "AI Through the Looking Glass," a newsletter published by Graeme Publishing Corp., Amherst, N.H.

- Don't wait for off-the-shelf applications
- There's good news for newcomers
- Technology-driven, supply-limited market

**Infant technology**

*Artificial intelligence has gone beyond basic research, or pure science, and is at the stage at which selecting appropriate applications for it is crucial, but AI is still far from a demand-driven market*



generic AI application products. Venture capitalists like high-growth industries (not services, such as consulting), little competition (not knowledge-based systems development tools) and high return on investment (not ad hoc AI applications).

**Poverty-stricken**

There are two other interesting — but often overlooked — factors indicating current trends in commercial AI: a lack of any significant breakthroughs in AI research and poor educational and training efforts within corporations.

In commercial knowledge-based systems development today, we use results of basic research done in the early to mid-1970s. That amounts to a gap of at least 10 to 12 years between research and commercial results. If this gap does not close up and no significant AI research results were found five years ago, we can predict that five years from now, AI applications will still be based on today's technology. If no breakthroughs occur today, we will be using the same technology 10 years from now.

The question is, Did we see any significant breakthroughs in AI in the last five years? I would say no. I follow AI research by looking over proceedings of the American Association for Artificial Intelligence and the International Joint Conference on Artificial Intelligence and have not seen any drastic changes in knowledge representation.

Moreover, I see AI research and commercial applications actually going in two different directions. The situation reminds me of one that existed 20 years ago: Early computer scientists were solving minimization problems in terms of a number of inputs (transistors), while people working in microelectronics tried to achieve the silicon area minimization by increasing the number of transistors but in regular configurations.

Educational and training efforts are other factors that indicate trends in the AI market. Universities do not produce

knowledge engineers. Need I say more?

Very few companies provide well-organized and practically oriented training curricula. Digital Equipment Corp., Boeing Computer Services, Unisys Corp., and Texas Instruments, Inc. are among the few firms that do offer effective training courses.

If training continues to lag, the shortage of qualified knowledge engineers and knowledge-based systems designers may become a major bottleneck in AI market development. By conservative estimates, we will need about 10,000 to 12,000 qualified knowledge engineers and knowledge-based systems designers in this country in three to four years. Today, we may have 2,000 to 2,500, but certainly not much more.

I recommend three kinds of education: for top management, for the end-user community — including middle management — and for developers.

**Trend watching**

Based on an analysis of current trends in AI technology and the marketplace, there are three major trends to watch in the near future:

- The AI market will still be technology- rather than demand-driven. As a result, application selection will remain a critical factor in the success of commercial knowledge-based systems development (see chart left).

- The AI market will remain limited by supply rather than demand. There will be a shortage of qualified knowledge engineers and knowledge-based systems designers. In addition, a short supply of cost-effective runtime environments, as opposed to knowledge-based systems development environments, may prohibit many mid-size companies from entering the AI market and developing in-house knowledge-based systems.

- Large-scale knowledge-based systems will be built relatively slowly, mostly in-house and primarily by big companies. For pri-

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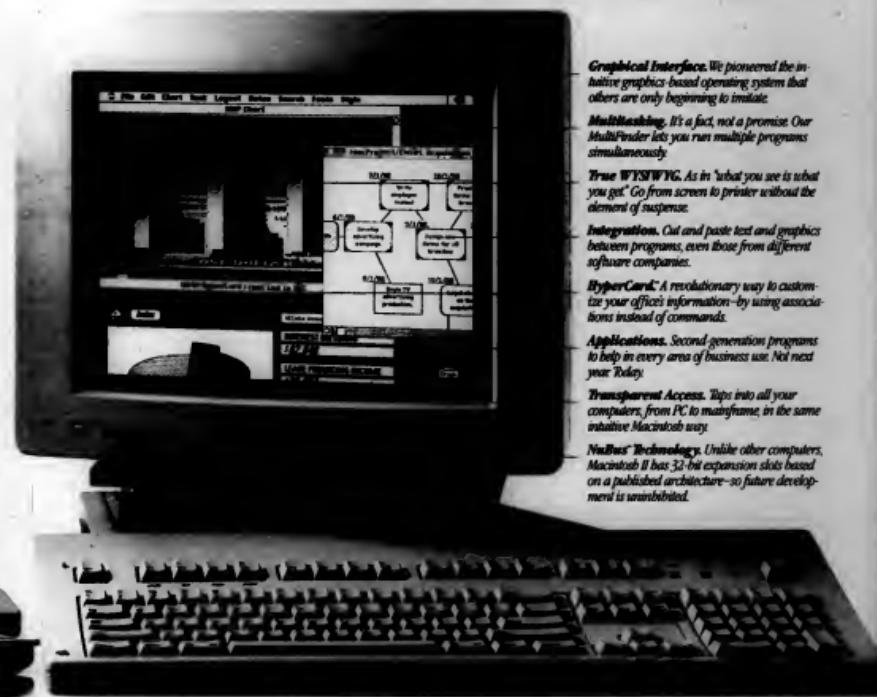
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next couple of years, small-scale knowledge-based systems will dominate; that is, double systems will prevail over high-intensity ones. Companies will be cautious in adopting AI technology, and AI projects will be mostly low-risk and low-benefit.

#### Strength in numbers

In the next year we will see further consolidation in the tool segment of the AI market. Some companies will go out of business, while others will survive, owing to strategic alliances with giants. I also predict hard times

vendors will contain embedded knowledge-based systems for preventive maintenance.

By this time, there will also be a few off-the-shelf AI application products for the manufacturing industry. In the human resources area, corporations will initiate expert systems projects in anticipation of retiring experts. And, finally, knowledge management will become one of

the major functions of corporate information centers.

The further into the future one looks, the easier it becomes to make predictions. I don't think, however, that five years is too far down the road. By that time, I expect the following to happen:

- Integration of AI technology with conventional software will be pretty much completed. The

term "AI industry" will not even be used because, frankly, there is no such industry, just as there is no industry of the second law of thermodynamics. The automobile industry and the software industry will use AI technology. • In five years, the software industry will grow to be very powerful, because as hardware becomes more and more a commodity, software will in-

creasingly add value to the turnkey product.

This should be a warning signal for companies that make most of their revenue in hardware. In five years, they will be typical commodity vendors, which compete mostly on a cost basis. Can you imagine IBM competing on a cost basis?

For two reasons, AI will play the most important role in

**I**N HUMAN resources, corporations will initiate expert systems projects in anticipation of retiring experts.

for hybrid tool vendors, such as Intellicorp in Mountain View, Calif., Inference Corp. in Los Angeles and Carnegie Group, Inc. in Pittsburgh, unless they become contracting companies like Teknowledge, Inc., in Palo Alto, Calif.

In addition, the LISP machine market will survive as a niche market only. The only thing that could change this situation, at least for some time, would be drastic price reductions attributable to the single-chip LISP processors developed by TI and Symbolics, Inc. in Concord, Mass. According to some sources, Xerox Corp. is about to announce its own single-chip LISP processor.

Also in the next year, we will see an avalanche of knowledge-based systems development tools with access to mainframe data bases and application packages written in conventional languages. IBM's KnowledgeTool is only the first robin in spring. That company will also come up with a high-level knowledge-based systems development tool, perhaps a version of Intellicorp's Knowledge Engineering Environment. IBM will provide compatibility for its tools across all of its computers.

In the coming months, I also expect many hardware and software tools to be readied for delivery. In terms of successful fielded AI applications, however, almost nothing will happen.

#### Takes three

Looking ahead three years, we will see an explosive growth of successfully fielded large-scale, integrated AI applications developed for business.

I also expect to see the first embedded LISP machines — for military applications — and the first embedded knowledge-based systems, mostly for fault diagnosis applications. Various pieces of equipment delivered by

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making the software industry powerful. First, it will add more value than any other computer technology I know of and will eventually make the difference between value-added and commodity-like software.

Second, a few far-sighted companies that have never before been in the software business will start developing in-house, ad hoc AI applications and

end up as software vendors, at least in their respective industries. As they develop their AI and general software capabilities, they will see that the software business can provide some fat profit margins.

Some of these fledgling software vendors will come up with general-purpose AI application packages based on their own expertise in both the problem do-

**W**E WILL notice the impact of AI on organizational structures, cleaning up the current mess in information and control flows.

main and knowledge-based systems development. We can expect generic packages to

come from these companies rather than from more specialized AI companies.

On another front, we will see the first computer-integrated enterprises in industries in which computers are intrinsic to the business, such as finance or manufacturing.

We will notice the impact of AI technology on corporate organizational structures, reducing the number of subordinate levels and cleaning up the current mess in information and control flows.

On the technological side of AI, we will see the proliferation of problem-oriented shells—knowledge-based systems development tools aimed at specific classes of problems, such as fault diagnosis, scheduling, planning and access to data bases.

On the scientific side, there will be some breakthroughs in applied knowledge representation theory, especially focused on decision making and planning applications.

#### Act or wait?

You can sit back and wait for the outcome of these predictions, or you can try to make them come true yourself. In the latter case, what should you do? To start, you should address four major issues:

- **Education.** Management and prospective users of knowledge-based systems must understand the strategic importance of AI technology and its social implications.

- **Corporate acceptance.** AI efforts have to be carefully planned and fostered within your company.

- **Application selection.** Knowledge-based systems development teams need to have expertise sufficient to select feasible and high-impact applications.

- **Integration.** Knowledge-based systems developers need to work on integrating those systems into existing conventional software, such as data sources and applications, rather than just develop stand-alone knowledge-based systems prototypes.

You should do all this not merely to justify my predictions. Addressing these issues determines whether you do or do not reap commercial benefits from AI technology. \*

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# MANAGEMENT

## TAKING CHARGE

*Don Ferruggia*

### The personal touch crucial

Data communications has become an incredibly technical field. Gone are the days when intrepid programmers would string wires between computers and invent their own methods for data transmission. Instead, we now have international standards, bit-slitting protocols, local-area networks, LUAs, PUs and X-Dot everything.

To implement a network, you need detailed training and expertise, but the results are worth the effort: global, reliable data communications systems that can expand to meet changing requirements. This is well understood in the MIS community.

What is not well understood is that communications between human beings has its own technology, a technology that has been advancing as quickly as data communications. The state of the art in human communications lies far beyond what most people consider possible. Personal communication can be precise, efficient, reliable and comfortable. This is true for anyone, no matter how easy or how "difficult" they are to deal with.

When communications are established between computers, the first messages that pass between them ensure that the communications link is sound. These "handshaking" messages have become quite detailed in the newer communications protocols. Yet even in the oldest asynchronous and teletypewriter systems, the first message of

*Continued on page 109*

## Migration hits mark

*National Semi draws Fairchild into MIS fold*

BY JAMES CONNOLLY  
CW STAFF

SANTA CLARA, Calif. — Faced with the integration of a decentralized, minicomputer-based MIS group into its centralized, mainframe-based operation, National Semiconductor Corp. recently met its deadline of converting key systems within four months of its acquisition of a former competitor.

Moving Fairchild Semiconductor Corp.'s worldwide distribution and customer service group off IBM System/38s did not go without a hitch, but the headaches were kept to a minimum during the transition project that ate up about 30,000 man hours, according to Patrick O'Haren, National Semiconductor's vice-president for computing and telecommunications.

The project was the first step in National Semiconductor's integration of Fairchild's MIS operation, which began when the

acquisition was finalized in October 1987 and should be completed by the end of this year, according to O'Haren.

### Quote on accomplishment

"Around the world, as systems and data were brought together, I saw a real feeling of accomplishment," O'Haren said. He said that in the 60 days following the first Fairchild locations being brought onto the National Semiconductor systems, there were a few complaints from users about particular features needing more work, but those generally were ironed out.

O'Haren and his 700-employee MIS group faced technical and sociological barriers when they began their conversion.

Fairchild's System/38 network was decentralized in both the physical sense and in how the systems were managed. Local groups had control at various locations throughout the U.S., Europe

*Continued on page 110*

## Prudential's MacKinnon champions MIS cause

BY ROSEMARY HAMILTON  
CW STAFF

Malcolm MacKinnon, soft-spoken and small of stature, is not the sort of man that stands out in a crowd.

Luckily, looks can be deceiving. As senior vice-president and head of information systems at the Prudential Insurance Company of America, MacKinnon has been chosen to lead a large crowd — some 85,000 employees — into a more technology-oriented future.

MacKinnon describes his role as helping to push the insurance giant into a more competitive future in which technology will help separate the leaders from the also-rans. His work is ideas, not the nuts and bolts of MIS. His job is more akin to a traveling preacher than to a traditional DP professional. His technique is to sell the MIS concept, again and again, throughout the company until the 30 business units have married their business plans to their MIS plan.

Having taken the post six years ago, MacKinnon says he believes he has a way to go in achieving this goal, but he also says there have been big improvements in the corporate attitude toward information systems.

Prudential information systems executives have a similar assessment of MacKinnon's progress.

"He has created an awareness that didn't exist, or wasn't as heightened as before, that we can use technology in a strategic sense," says Lee Taylor, vice-president of information services at Prudential's district agencies group headquarters in Newark, N.J. "He's been very

### PROFILE

Malcolm MacKinnon



effective at moving Prudential along."

Coordinating Prudential's information systems efforts with an overall strategic plan is a mammoth task. Prudential's structure is based on 30 business units, each of which has its own data processing organization. Altogether, there are 5,000 information systems employees. Each business unit has a chief information systems executive who reports directly to the business unit president and indirectly — through a dotted-line structure — to MacKinnon.

MacKinnon is based at Prudential's Roseland, N.J., data center, its corporate data hub. He is directly responsible for an annual information systems budget of \$130 million. In addition, the Roseland facility serves as a clearinghouse for the multiple

*Continued on page 108*

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## Mackinnon

FROM PAGE 107

business units' information systems office. While each business unit's DP executive is responsible for his own budgeting and planning, MacKinnon maintains a watchful eye and has the authority to veto decisions.

MacKinnon says the business

plans of each unit as well as the information systems plans review at his office each year. He reviews them to see how closely the plans dovetail.

### Links on the rise

"The amount of linkage between the two halves is increasing every year," MacKinnon says. "More than half the units have linkage by now. But there's a continuing

need to improve the plan."

Citing the competitive nature of Prudential's business, MacKinnon was reluctant to discuss the concrete results from this integration.

Instead of giving away details of the more critical "technology weapons," MacKinnon points to obvious innovations for which he takes credit, such as the use of laptop personal computers by

the company's agents.

Agents, MacKinnon says, are more frequently winning clients with a single sales call, rather than with two or more, because most of a potential client's questions can be answered on the spot with the data stored in the laptop.

To ensure that programs like the use of laptops are implemented, MacKinnon takes to the

road regularly, stopping at each of the company's business units to meet with the DP executives. In addition, he promotes his ideas in the executive suite of Prudential so that a pro-information systems attitude flows from the very top.

### But seriously, folks . . .

According to the business unit's information systems leaders, MacKinnon is effective at stirring up interest in technology because his presentations are typically laced with humor and often have a "Star Wars" tone to them.

He is also known for his presentation wrangle, in which he illustrates the highlights with stick figure drawings of the DP executives and their statements. "He is soft spoken, but he's not

## SCIENCE/SCOPE\*

**Hughes Aircraft Company's advanced air traffic control system developed for the Republic of Korea won the only 1987 industrial award given by the Air Traffic Control Association. The award recognizes outstanding industrial contributions to the field of air traffic control. Hughes delivered the system within budget and within a tight, 28-month schedule. It features advanced conflict alerts, modern aircraft control displays, advanced computers and a high-speed local area network. The new system, based in Taegu, South Korea, has operated without failure since it began service in 1986.**

**The Hughes Probeye® Thermal Video System is being used to detect defects in printed circuit boards (PCBs) well in advance of component failure. Overheating defects in PCBs are the most prevalent cause of problems, and are frequently impossible to localize prior to actual failure using conventional testing methods. The Probeye Thermal Video System "looks" at the PCB, develops a thermal signature, then compares it with thermal parameters on a board known to be without defects. Hidden problems are quickly revealed, and corrective action can be taken before the board leaves the factory, thereby eliminating downtime, improving customer service, and decreasing costs.**

**A system for night reconnaissance, border surveillance, and specialized military applications has recently completed 150 successful cross-country demonstration flights. The approach utilizes a Hughes Night Vision System (HNVS) aboard Schweizer Aircraft Corporation's new SA 2-37A Special Purpose Aircraft. The HNVS is a forward-looking infrared (FLIR) system that lets crew members see at night and in poor visibility conditions. Unlike radar, the FLIR emits no energy of its own that can be detected during operations. It can locate and track vehicles and, at its maximum magnification setting, can even delineate individual tree limbs and branches. HNVS is in use by the U.S. Army and the U.S. Customs Service, and was selected for use on the proposed V-22 Osprey tilt-rotor aircraft.**

**Hughes designed and built a probe for the Galileo Mission, which is expected to unlock the secrets of Jupiter, providing scientists with data about the planet's atmosphere. Scheduled for launch from the Space Shuttle in late 1989, Galileo will employ a solid-fueled Inertial Upper Stage rocket, aided by gravity assists from Venus and Earth, to boost itself from the Shuttle's orbit to the giant planet. Once Galileo is within reach of outer Jupiter, the Hughes-built probe will be released into the Jovian atmosphere. During its 60-minute descent to the surface, the probe will continually broadcast scientific data back to Galileo, which will then transmit the information to Earth.**

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 33 Dr. Mgr. Sales - G/M/Sales  
 35 Dr. Mgr. Sales - G/M/Sales  
 37 Dr. Mgr. Sales - G/M/Sales  
 39 Dr. Mgr. Sales - G/M/Sales  
 41 Dr. Mgr. Sales - G/M/Sales  
 43 Dr. Mgr. Sales - G/M/Sales  
 45 Dr. Mgr. Sales - G/M/Sales  
 47 Dr. Mgr. Sales - G/M/Sales  
 49 Dr. Mgr. Sales - G/M/Sales  
 51 Sales Mgr. Mktg.  
 53 Manufacturing/Computers  
 55 Consulting Mktg.  
 57 Manufacturing/Accounting Mktg.  
 59 Education/Journals/Libraries/Students  
 61 Other
- Please specify

- 3 COMPUTER EQUIPMENT (cont. cont.)  
 17 DRUGS/PHARMACEUTICALS  
 19 DRUGS/PHARMACEUTICALS  
 21 DR. Mgr. Sales - G/M/Sales  
 23 DR. Mgr. Sales - G/M/Sales  
 25 DR. Mgr. Sales - G/M/Sales  
 27 DR. Mgr. Sales - G/M/Sales  
 29 DR. Mgr. Sales - G/M/Sales  
 31 DR. Mgr. Sales - G/M/Sales  
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 45 DR. Mgr. Sales - G/M/Sales  
 47 DR. Mgr. Sales - G/M/Sales  
 49 DR. Mgr. Sales - G/M/Sales  
 51 Sales Mgr. Mktg.  
 53 Manufacturing/Computers  
 55 Consulting Mktg.  
 57 Manufacturing/Accounting Mktg.  
 59 Education/Journals/Libraries/Students  
 61 Other
- Please specify

- 348819-0
- 1 BUSINESS INDUSTRY (cont. cont.)  
 18 Manufacturing Sales, Marketing  
 26 Financial Services, Real Estate  
 28 Medical/Law/Education  
 30 Government  
 32 Business Services/Research/SPR  
 34 Communications/Systems/Public Utilities  
 36 Transportation/Manufacturing/Agriculture  
 38 Mining/Construction/Computers/Computer-Aided  
 40 Manufacturing/Computers/Computer-Aided  
 42 Systems/Ordnance/Defense  
 44 Computer Services, including Software/Service  
 46 Business/Time-Sharing/Consulting  
 48 Computer General Data Distribution/Reseller  
 50 User Other
- Please specify

- 2 TITLE/FUNCTION (cont. cont.)  
 16 MGR OF MANAGEMENT  
 17 Dr. Mgr. Sales - G/M/Sales  
 19 Dr. Mgr. Sales - G/M/Sales  
 21 Dr. Mgr. Sales - G/M/Sales  
 23 Dr. Mgr. Sales - G/M/Sales  
 25 Dr. Mgr. Sales - G/M/Sales  
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 45 Dr. Mgr. Sales - G/M/Sales  
 47 Dr. Mgr. Sales - G/M/Sales  
 49 Dr. Mgr. Sales - G/M/Sales  
 51 Sales Mgr. Mktg.  
 53 Manufacturing/Computers  
 55 Consulting Mktg.  
 57 Manufacturing/Accounting Mktg.  
 59 Education/Journals/Libraries/Students  
 61 Other
- Please specify

- 3 COMPUTER EQUIPMENT (cont. cont.)  
 17 DRUGS/PHARMACEUTICALS  
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 21 DR. Mgr. Sales - G/M/Sales  
 23 DR. Mgr. Sales - G/M/Sales  
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 27 DR. Mgr. Sales - G/M/Sales  
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 61 Other
- Please specify

- 348819-0
- 3 COMPUTER EQUIPMENT (cont. cont.)  
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 51 Sales Mgr. Mktg.  
 53 Manufacturing/Computers  
 55 Consulting Mktg.  
 57 Manufacturing/Accounting Mktg.  
 59 Education/Journals/Libraries/Students  
 61 Other
- Please specify

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## Ferruggia

CONTINUED FROM PAGE 107

the day was usually "hello" or "good morning," just to make sure the line was working.

How often is this important step forgotten in human communications? Consider this scenario:

John has been working feverishly on a production problem and has now located the critical area in the program. He has worked overtime for the last two days and has come in early this morning; he is close to the solution. Suddenly, he hears a voice behind him. It belongs to his manager: "You were supposed to have your status report on my desk an hour ago!"

John is likely to become upset and shout a few choice words at his manager. He may feel his manager doesn't know or care about his work and doesn't appreciate his effort. Is this really the case? Probably not.

What has actually happened is that John was shocked by the abrupt change in context.

### See me, hear me . . .

To understand his manager's communication, John's brain must hear the voice behind him, recognize that the voice is directed at him, identify it as his manager's and break his concentration.

He then must understand the literal meaning of the sentence, reconstruct the first few words he probably lost, search his memory to support or disprove the manager's factual allegations and construct a reply.

Finally, after John's interaction with his manager is complete, he must re-establish his concentration and return to the point at which he was interrupted.

What was missing in this scenario was a handshaking sequence. Handshaking is important in human communications, especially when you are interrupting. The handshake identifies the speaker, establishes the relative importance of the communication and allows the listener to shift his attention smoothly from his work.

### Power of politeness

How differently would John have reacted if his manager stood in front of him and said, "Excuse me," waited for him to look up and then said, "I know you're busy, but could you give me your status report as soon as you get a chance?"

By standing in front of John and saying, "Excuse me," John's manager gets his attention and makes it easy for John to identify who is speaking. It also gives John's chance to put his concentration on hold and turn his attention to his manager. This will also make it easier to return to his state of concentration after the interaction is complete.

By saying, "I know you're busy," John's manager lets him know that he understands the importance of John's work and that the content of this communication has a somewhat lower priority. By saying, "Could you give me your status report as soon as you have a chance," he delivers his communication as a request rather than a statement of fact. In this way, John can accept it as is and act on it as soon as possible.

In the previous scenario, when the manager told John "You were supposed to . . .," John could not even understand

**J**OHN HAS BEEN working feverishly on a problem and has located the critical area in the program. He has worked overtime and has come in early this morning. Suddenly, he hears his manager behind him: "You were supposed to have your report on my desk an hour ago!"

the communication without actually searching his memory to determine whether he was in fact supposed to do so. When the same communication is phrased as a request, John does not need to refer to his memory, and, thus, his attention is less distracted from his work.

The points to remember when beginning a communication with someone who

is working at a task are the following:

- Make your presence known by standing in the person's field of vision and saying something to get his attention.
- Wait for the person to acknowledge your presence.
- If possible, tell the person how your communication relates to what he has just been doing.

• State your communication as succinctly as possible. If you want the person to do something, phrase it as a request or question and let him know whether it needs to be done before or after he finishes his task.

When beginning a communication with someone who is not concentrating on a task, the steps are as follows:

- Make your presence known, and get the person's attention.
- Talk about trivial matters until you are both comfortable. This is known as "building rapport."
- State the topic you want to discuss.
- Engage in conversation.

Ferruggia is a psychologist and president of Personal Excellence, Inc., in Warwick, N.Y.



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Dennis M. Lynch  
President  
Merida Trading Group

Merida Trading Group of Woburn, Massachusetts, buys, leases and sells used Digital equipment. And it's become one of the top 20 such firms in the country, according to company President Dennis M. Lynch. Merida most often acquires equipment from financial institutions, large corporations and leasing companies.

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For all the facts, call Debbie Eisenberg, Computerworld MARKETPLACE Sales Director, at (201) 967-1358.

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## CALENDAR

APRIL 11-12

**Memphis.**, Nashville, April 24-27 — Contact: Federation of IBM User Groups, Mail Station UPA-2, Dayton, Ohio 45475.

**Ingenier Users Association Spring 1988 Conference.**, San Diego, April 24-27 — Contact: Fred Adams, INGENIER Computer Components, Efficient Systems, Inc., Suite 1-2, 2601 Wyoming N.E., Albuquerque, N.M. 87113.

**Computer-Based Training Conference & Exposition.**, Washington, D.C., April 24-27 — Contact: Jim Stoen, Registrar, Computer-Based Training Conference Management Publications, Inc., 36 Chemer St., Boston, Mass. 02111.

**Computer Spring '88 Conference: Emerging Technology.**, Hollywood, Fla., April 24-28 — Contact: Computer, Suite 600, 111 E Water Drive, Chicago, Ill. 60601.

**Unfinished Works: The Where, Competitive Products and Conference.**, Los Angeles, April 25-26 — Contact: Data Beat Publications, Suite 265, 8219 Capital of Texas Highway, Austin, Texas 78721.

**Special Briefing and Workshop on What Every Computer Executive Needs to Know About Data Processing.**, April 26-27 — Contact: Advanced Information Management, 1988 Optix Blvd., Woodbridge, Va. 22191.

**HLDBK '88.**, San Jose, Calif., April 26-27 — Contact: International Planning Services, Inc., 4000 Corporation Way No. 1, Redwood City, Calif. 94062.

**Support Systems — Solutions in Manufacturing Environment Support.**, Dearborn, Mich., April 26-28 — Contact: Marc Horowitz, Engineering Society of Detroit, P.O. Box 2400, 24 Frank Lloyd Wright Drive, Ann Arbor, Mich. 48105.

**Distributed Network Computing.**, Cambridge, Mass., April 27-28 — Contact: Guidelines — Mktg Forum '88, Box 456, Orinda, Calif. 94563.

April 27-29 — Contact: Patricia Seydel's Office Consulting Group, Suite 612, 148 State St., Boston, Mass. 02109.

**IBM/Codex Users Group.**, Clearwater Beach, Fla., May 1-4 — Contact: William S. Kettler, Executive Director, IBM/Codex Users Group, P.O. Box 2156, Altamonte Springs, Fla. 32715.

**IC 1988 Annual Conference: Management of Change and Innovation Supporting the Explosions of End-User Computing.**, Miami, May 1-4 — Contact: Information Center Institute, 3224 Commerce Drive, Carrollton, Texas 75006.

**International Association of Systems Users Conference.**, Houston, May 1-4 — Contact: Gary K. Carson, P.O. Box 1359, Super Land, Texas 77487.

**Spring Conference on Business Recovery and Computer Security.**, Marco Island, Fla., May 1-4 — Contact: Pat Walker, Harris Driller Associates, Corporate Offices, 2718 Tudor Parkway Drive, Duluth, Ga. 30037.

**International Symposium on Information Resources.**, Monterrey, Mexico, May 1-5 — Contact: Sistema de Fomento Managerial, Av. Universidad, 112, Suite 112, 74105, N.T. Third Ave., Portland, Ore. 97204.

**The Business Payoff in Information Technology Conference.**, New York, May 3-5 — Contact: Ales Riva, 1223 Avenue of the Americas, Suite 4040, New York, N.Y. 10020.

**Guidelines/Marketing Forum '88.**, Chicago, May 3-5 — Contact: Guidelines — Mktg Forum '88, Box 456, Orinda, Calif. 94563.

**DRMS User Group Meeting.**, Chicago, May 3-4 — Contact: Beverly Van Kirk, Conference Coordinator, P.O. Box 6000, Ofcice Center, 4343 Commerce Court, Lake Bluff, Ill. 60062.

**Eastern Communications Personnel.**, Ryb Brook, N.Y., May 3-4 — Contact: Eastern Communications Personnel, Suite 600B, 505 N. Lake Shore Drive, Chicago, Ill. 60611.

**Westinghouse Hosted User Group Meeting.**, Pittsburgh, May 3-4 — Contact: Westinghouse Electric Corp. Management Systems Software, P.O. Box 2726, Pittsburgh, Pa. 15236.

**A/VC SYMPOSIUM '88.**, Chicago, May 3-5 — Contact: Steven Price, A/VC Systems, P.O. Box 11218, New York, N.Y. 10111.

**International Forum for Air Cargo, Air Cargo Terminal Operators and Airfreight Forwarders.**, Milwaukee, Wis., May 3-6 — Contact: Society of Air Cargo Engineers, 400 Commonwealth Drive, McLeanville, Pa. 15066.

**National Conference on Manufacturing.**, 1988 IBM Information Systems, Chicago, May 3-4 — Contact: Greg Martin, 400 Commonwealth Drive, McLeanville, Pa., May 3-4 — Contact: James L. Schmitz, Department of Manufacturing, P.O. Box 687, 1915 Sheridan Drive, Jefferson City, Mo. 65101.

**Data Base Management Association Workshop.**, New Orleans, May 3-5 — Contact: DEBMA, 101 Morris 7 Cypress Park, Port Huron, Conn. 06851.

**Facilities '88 — International Facilities Management Association Conference.**, Chicago, May 3-5 — Contact: Gary Greenberg, Sunbeam Tower, Suite 1410, 111 Greenwich Plaza, Houston, Texas 77046.

**CASEXP '88 — The National Computer Aided Software Engineering Conference & Show.**, Dallas, May 3-4 — Contact: CASEXP '88 Coordinator, 3835 E. Dallas North Drive, Dallas, Texas 75241.

**Artificial Intelligence and Advanced Computer Technology Conference/Exhibition.**, Long Beach, Calif., May 4-6 — Contact: Dr. Murray Tavel, General

Program Chairman-AI '88, c/o Intelligent Choice, Suite D, 1650 Duncan Ave., Mountain Brook, Calif. 91109.

**Pittsburgh Conferences on Modeling and Simulation.**, Pittsburgh, May 4-6 — Contact: William G. Vogt, Modeling and Simulation Conference, 344 Beeson Engineering Hall, University of Pittsburgh, Pittsburgh, Pa. 15261.

**Temple University Symposium on Telecommunications State Regulatory Alternatives for the Future.**, Horsham, Pa., May 5-10 — Contact: School of Communications and Theater, Temple University, 15 Academy St./RTV, Philadelphia, Pa. 19123.

**Comdex/Spring '88.**, May 8-12, Atlanta. Contact: The Intercom Group, 200 Post Ave., Roswell, Ga. 30076.

**Anual Meeting of the ASI Users Group.**, St. Louis, Mo., May 13-15 — Contact: James L. Schmitz, Department of Manufacturing, P.O. Box 687, 1915 Sheridan Drive, Jefferson City, Mo. 65101.

**Western '88 Technology Bridge.**, Denver, May 10-12 — Contact: Electra, 8110 Airport Blvd., Los Angeles, Calif. 90044.

**National Online Meeting.**, New York, May 10-12 — Contact: Lorraine Johnson, 140 Old Market Stn., Medfield, Mass. 02052.

**Manufacturing/Computer Expo '88.**, Chicago, May 11-12 — Contact: CMC, Inc., Box 453, Elgin, Ill. 60134.

**NMRA Seminar On POS and In-Store Systems.**, Dallas, May 13-15 — Contact: National Retail Merchants Association, 100 W. 51st St., New York, N.Y. 10020.

**Hardware Manufacturing Association Conference.**, Springfield, Mass., Philadelphia, May 15-18 — Contact: Jim Hanley, c/o Electronic Technologies, Inc., EAHA Conference, 2744 Washington Street, Abington, Pa. 19004.

In addition, National Semiconductor had experience in bringing together users of diverse systems, having brought its European operation onto the NMRA systems a year earlier.

A final advantage was Fairchild's own premerger lineage. "Prior to our acquiring Fairchild, they had ideas about doing something similar. They were already tending toward putting in a somewhat centralized system," O'Hares said.

National Semiconductor is now looking at the remaining steps, which include more combined data bases, integration of financial systems and integration of customer information and sales systems.

One strategy adopted from Fairchild was the spin-off of the computer-integrated manufacturing systems group from MIS. That group now reports on a parallel track alongside the MIS organization.

O'Hares offered two points of advice for other organizations considering similar mergers. The first is the exposure of prospective changes to close scrutiny, working in the minutest detail so all elements can be checked and cross-checked.

"When it becomes certain that you are going to do it, set a specific goal for when you will have it done," he said. "Then move quickly to achieve that goal — even to achieve perfection, don't extend that deadline because otherwise enthusiasm could wane, and you may never finish."



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**Patrick O'Hares**

# COMPUTER INDUSTRY

## INDUSTRY INSIGHT

Clinton Wilder

### Who woulda thunk it?

Nothing lasts forever. Expect the unexpected. The leading-edge technology of today becomes tomorrow's Edsel.

These business maxims can almost always apply to the computer industry. But this year, at least as of tax day last week, has had more than its share of surprises.

Compared with what was supposed to happen in the industry as per the predictions of the past three years, this year's headlines are leaving MIS executives scratching their heads. Like the old-time baseball fan marveling at the unexpected success or failure of a beloved team, computer industry observers are looking at the following developments and asking, "Who woulda thunk it?"

The major copyright and patent infringement suit of the year is filed by Apple, not IBM.

When Big Blue introduced its compatible-killing Personal System/2 line one year ago, clone makers from Taipei to Fort Worth were nervously anticipating what the Armook

*Continued on page 116*

## Is EDS stalling non-GM dealers?

*Auto sellers stuck in neutral with on-again, off-again service*

BY ELENAH HORNWITT  
CW STAFF

DETROIT — Auto dealers that sell non-General Motors Corp. cars say their computer operations are getting short shrift from GM-owned Electronic Data Systems Corp. (EDS).

When EDS purchased the rights to American Financial Resources' (AFR) finance and insurance software package in September 1987, it inherited AFR's customer base of about 100 non-GM car dealers, 80 GM

car dealers and 40 marine customers, according to EDS public affairs representative Anthony Good. On March 3, EDS sent a letter to the former AFR customers announcing that it would terminate service and maintenance contracts in 30 days. The company, however, could continue to support GM dealers "under a variety of alternatives," Good said.

But on April 1, EDS cancelled the cancellation, informing non-GM dealers that it will continue to service their AFR packages

until an alternative provider can be found. The company is currently considering several alternative ways to continue service to non-GM dealers, such as contracting with former employees of Indianapolis-based AFR, Good said.

"A lot of [non-GM] dealers like ourselves are up in the air, shot off by EDS with no support. We have contacted our attorneys," said Richard Jorgenson, finance and lease manager for Mid Ohio Imported Car Co. in

*Continued on page 115*

## Support net keys SSA's big growth

BY JEAN S. BOZEMAN  
CW STAFF

CHICAGO — If distributed processing is the key to success in the IBM System/36 and 38 market, software vendor Systems Software Associates, Inc. (SSA) has applied the same principle of distribution to the area of computer support.

President Roger Covey credits his distributed principle with boosting 6-year-old SSA from a \$3.9 million firm in 1984 to a \$30.5 million firm last year. The key to SSA's dramatic expansion, 32-year-old Covey said, is the unique affiliate program the Chicago-based firm has put in place around the world.

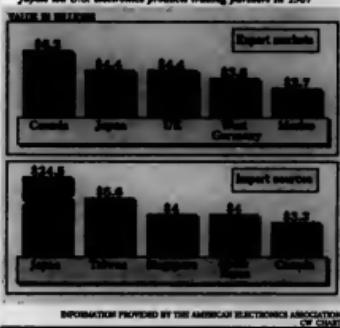
From the U.S. to Europe, Asia and Australia, SSA's 45 affiliates are a network of support providers that install and maintain its software at 2,400 customer sites. In exchange for their efforts, affiliates get commissions from client fees; the software license fees go directly to SSA's headquarters. SSA projects that it will end its 1988 fiscal year with about \$60 million in revenue from those licenses.

What the affiliates are selling is SSA's Business Planning and Control System (BPCS), the umbrella product for more than 20 applications modules. BPCS was designed by Covey and SSA's first three employees as an inte-

*Continued on page 116*

## Data View

Rising sun shone brightly  
Japan led U.S. electronics products trading partners in 1987



## Relational goes public

BY NELL MARGOLIS  
CW STAFF

ALAMEDA, Calif. — A funny thing happened to Relational Technology, Inc. on its way to the public stock market.

The maker of the largest relational database management system filed its much-debated, long-awaited initial public offering at 3:00 p.m. Friday, Oct. 16, 1987 — which explains why the offering was put on hold the next week.

But six months after Black Monday, Relational Technology is knocking on the door of the Securities and Exchange Commission (SEC) once more. The company amended its earlier filing

*Continued on page 117*

## AT&T's Olson takes time off to recuperate; Allen fills in

BY ALAN ALPER  
CW STAFF

NEW YORK — AT&T Chairman and Chief Executive Officer James Olson has relinquished his responsibilities for an indefinite time while recovering from major surgery, the company disclosed last week.

Olson, 62, underwent surgery March 25 for removal of a malignant tumor and is recuperating at his Short Hills, N.J., home, an AT&T spokesman said. President and Chief Operating Officer Robert Allen, 53, is running the company in Olson's absence, the spokesman said.

Under AT&T bylaws, the president assumes the responsibilities of the chairman if the latter is unable to fulfill those du-

ties, the spokesman said. There is no provision regarding how long Allen can continue to run the company without board approval, he added.

**Taking critical**  
Olson's illness comes at a critical juncture for the telecommunications and computer company. In his 18 months on the job, Olson has been instrumental in reducing expenses, which has bolstered the firm's bottom line, and has adopted strategies that have strengthened AT&T's position in its core telecommunications business.

Moreover, AT&T appears to have finally found a winning computer strategy based on its networking expertise, ownership of the Unix operating sys-



Chairman Olson

tem and a licensing agreement with Sun Microsystems, Inc.

"Olson has done a lot in a short period of time," noted Bart Stuck, an analyst at Probe Research, Inc. and a former Bell Laboratories employee.



President Allen

Allen is considered the odds-on favorite to succeed Olson when he reaches mandatory retirement at age 65. "Alles would be the right guy for the job," Stuck said. "He's a capable manager, and right now, it's no long-

er an issue of strategy for AT&T, but one of blocking and tackling."

Disclosure of Olson's illness came in response to press queries last week. AT&T was not obliged by Securities and Exchange Commission regulations to disclose the situation.

The AT&T spokesman said it is too early to say when Olson will return to his job. Olson's recovery is proceeding well, he noted, adding that it is unlikely the chairman will attend the company's annual shareholders' meeting this Wednesday.

Olson joined AT&T in 1943 as a splice's assistant at the Northwestern Bell division. He worked his way through the Bell system and was named president and chief operating officer of AT&T in 1985 before succeeding former Chairman Charles Brown in 1986.



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than they were getting from IBM.

And the experts laughed.

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This survey also reports that 97% of our customers would recommend our mainframes to other

users in their situation—the highest percentage in our industry.

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INDUSTRY WEEK  
IN BRIEF

## EDS

CONTINUED FROM PAGE 111

**Computer Professionals, Inc.**, called a quick bid meeting in its first day of existence last week. The company, which is based in San Jose, Calif., has been formed by a group of computer professionals who have left the ranks of the Computer Systems Division of General Motors Corp. to form their own consulting firm.

**Midwest Auto Parts Electronics Co.**, 2000 W. 108th St., Suite 342, Kansas City, Mo. 64153, has been granted a franchise to sell GM's GMAC electronic parts line.

**GMAC**, the GM electronic parts division, has been renamed GMAC Electronic Components and GMAC Electronic Components Division.

**Another former top-ranking Datsun Computer executive** has joined yet another GM dealer. Donald L. Steele, formerly general manager of Datsun's General Motors' "Dealers," will now serve as president and chief executive officer of the new Midway, Indianapolis, Ind., dealership. GMAC has a dozen of such dealerships for the electronic and automotive business. In addition, GMAC has a number of other dealerships throughout the country.

## Columbus, Ohio.

Jorgenson's complaint illustrates the potential pitfalls for computer users when their software or services vendor is acquired by a company that competes directly with those users in another industry. GM's attempt to gain a competitive edge through computer technology may conflict with the business goals of some EDS customers.

EDS decided to discontinue the service "probably as a way to make trouble for non-GM dealers," Jorgenson said. "Now, I think they've gotten way too many complaints, and attorneys are getting in-

volved, so they're backing off and saying, 'Hey, let's give them support until they have an alternative.'"

EDS's Good said the Dallas-based processing services giant decided to discontinue the service to non-GM dealers that originally bought "stand-alone" software from AFR, not from us." EDS bought the AFR software in order to sell it as part of Dealerline, a family of software products that the company developed and began marketing last June to GM dealers only, he added.

One strong motive for EDS to discontinue itself of its non-GM service contracts is to free more resources for servicing the 200 GM dealers that have purchased Dealerline packages so far. EDS has "run into trouble providing adequate support" for

those customers, Good said. "We got more customers than we expected."

So far, the company has installed Dealerline packages for 160 dealers, and it is delaying installation of the remaining 40 until it can support them, Good added. EDS has suspended sales of new Dealerline systems until October.

According to Mid Ohio's Jorgenson, "Service levels started going downhill when EDS took over the AFR contract." Mid Ohio has been waiting more than two months for EDS to fix an error in the software that handles its lease/lease contracts, Jorgenson said. "They tell me they've been really backlogged from all the work that got dumped on them [from AFR's customer base], so they are only responding as people call and complain."

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## Support net

FROM PAGE 111

grated series of programs, including manufacturing, materials handling, financial, data base, distribution and decision-support packages.

Because the modules are compatible, they allow a small company to put together an ambitious business plan without having to hire a large programming staff to write customer software.

### Multinational support

Covey said he sees the affiliate concept as one that projects SSA's products around the world with a minimum of overhead and a maximum of local support, even if it is in French, Spanish, German or Chinese.

"We've built a network around the world of independent software and professional services firms," Covey said. "Some of our affiliates are IBM MAPs [Marketing Application Program members] or VARs, but they all are systems integrators that can provide strong local support for our customers. You don't have to have a direct sales force to serve your customers well."

Using software agents, affiliates view their resale of SSA's

System/36 and 38 application software as part of their own success, according to analysts who follow SSA. "It's more like a family relationship," said Donald Wompach, director of research at Oberweis Securities, Inc., a Chicago brokerage firm. "Both parties — the affiliates and SSA

— want to protect each other's interests."

Sometimes, the SSA family ties are complicated by its acquisition of the affiliates as SSA subsidiaries. That is what happened last year to Chicago-based System 38, Inc., New England affiliate ASE Services, Inc. and SSA's Australian affiliate, Admin EDPE.

Covey's theory is that the world's mid-size companies — those with annual revenue in the hundreds of millions — present the greatest business opportunity for software vendors such as SSA. These growing firms often add system capacity and software applications as their businesses expand yet face changing

Companies like that will need even more software support in June when IBM is expected to introduce the latest version of the System/36 and 38 family, code-named Silverlake. The machine will most closely resemble a System/38, Covey said, although it has been designed to run System/36 programs, too.

Covey said he has been briefed on IBM's System/36 and 38 product plans because SSA is an IBM value-added reseller within IBM's National Distribution Division.

SSA has a direct sales and support service for its largest corporate clients — among them Procter & Gamble Co.,

Gillette Corp., Philip Morris Co. and Pfizer, Inc.

**Wilder**

FROM PAGE 111

legal team might do to potential market share nibblers. They are still uneasy, but on the opposite coast, Apple decided that Microsoft and Hewlett-Packard were getting a little bit too user-friendly for Apple's taste.

Given Apple's precedence of tough, successful legal actions against Apple-like software developers Digital Research and hardware vendor Franklin Computer, the Microsoft-HP suit shouldn't have been as surprising as it was.

Despite Apple's image as a laid-back Hawaiian-shirt-and-sneakers company, John Sculley and friends didn't get the firm to where it is today without being tough.

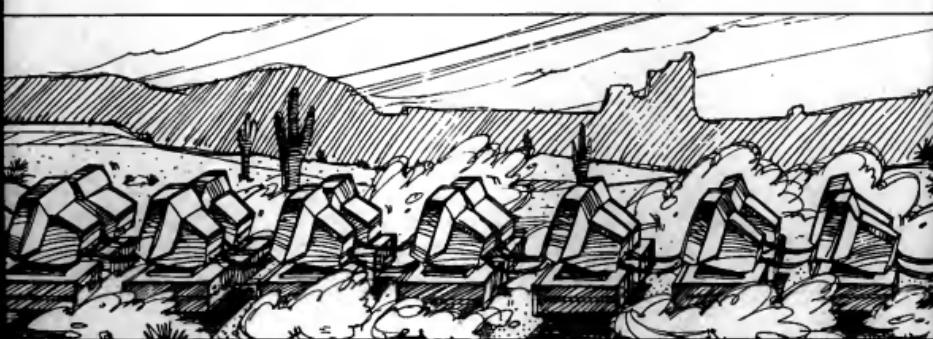
The large amount of affiliate oversight SSA provides may be a tiring task, Covey said, but it has some pleasant aspects, too. One of these is the collection of Asian artifacts that decorate SSA's new offices in the tower above Chicago's Northwestern railroad station.

"Local support, particularly with respect to the Chinese- and Japanese-language firms, is important," Covey said. "It takes great strategic focus on the part of software and services companies to provide that kind of support. It takes a long-term commitment."

Absolutely unbelievable.

Two years ago, U.S. companies were stampeding out the memory chip industry exit door while throwing trade sanctions at their Japanese competitors for causing the RAM glut. Now

they want the Japanese to play



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ball and ensure that there are adequate supplies of dynamic RAMs. When?

This is uncontrollable proof that semiconductors are a cyclical business. Chip vendors misjudged the fact when they overextended their RAM production capacities at the beginning of the decade and appear to have done it again when they exited the business. But they're cheering from the mountaintops in Boise, Idaho, where tiny RAM chip stalwart Micron Technology is casting in its you-know-whats.

#### DEC stock plunges below postcrisis levels.

OK, so the company said its first calendar quarter wouldn't be up to snuff, but it's still hard to believe DEC is trading some 90 points below its high-water mark of 1979. The market was incredibly unforgiving to DEC a few years back, and despite the company's enviable track record since then, Wall Street seems to have a long memory.

DEC will have a tough time duplicating its growth rates of the past two years, and it does face a price/performance challenge to its more expensive VAXs — both from Sun-type workstations and its own Microvaxes. But Wall Street seems

to be ignoring the fact that DEC has clearly established itself in the MIS world after years of resistance. With the exception of a few all-Bell user businesses like the insurance industry, DEC's momentum has put it on a lot of MIS approved-vendor lists. These guys will be around for the long haul.

#### AT&T gets industry "credibility" by teaming up with Sun.

Remember a short time ago, when AT&T was about to chal-

## R EMEMBER WHEN Sun was little more than an interesting Silicon Valley start-up?

lenged IBM in the new global computer and communications industry, and Sun was little more than an interesting Silicon Valley start-up? The best measure of how much things have changed is the current Unix controversy.

AT&T was frustrated for years because no one took commercial Unix seriously. But the moment AT&T named Sun as its

Unix partner, Hewlett-Packard, NCR and other vendors cried that the partnership might lock them out of the new industry standard.

#### IBM will back its 16% stake in MCI.

AT&T isn't the only corporate giant whose vision of the computer and communications technology marriage fell short of reality. Three years ago, the IBM and MCI partnership was supposed to be a major — and not cheap — piece of IBM's communications strategy; many felt Big Blue would eventually acquire MCI as it did with Rola, to offer cradle-to-grave networks of voice and data to its large customers.

Instead, both IBM and MCI met some unexpected hard times in their own houses, and the inside word is that MCI became a victim of IBM benign neglect. MCI has gotten back on its feet while IBM has pulled back from or downplayed, with the exception of Rola, almost all of its much-heralded partnerships: Intel, Stratus, Merrill Lynch and Hogan Systems. Score another one for the skeptics of "strategic alliances."

*Writer is Computerworld's senior editor, computer industry.*

## Relational

FROM PAGE 111

April 7 and is now undergoing SEC review. Within the next 1½ to two months, Relational Technology expects to be actively trading over the NASDAQ national market system.

According to Paul E. Newton, president of Relational Technology, the crash never crushed the company's hopes of going public in the near future. "It was disappointing to us," he said, "but we've looked on it as a temporary setback, not as a catastrophe."

For some time, Newton said, a public offering of Relational Technology has been more a matter of "when" than "if."

In addition to seeking cash funding for continued growth, the company, which recently announced a racy release of its flagship Ingres DBMS, is hoping that its emergence as a public company will boost its credibility.

"We've seen customers who somehow feel more comfortable if they're dealing with a public company, for some reason," Newton said. "Certain competitors like to make snide remarks about the confidence level of a company that remains private;

we'll be happy to live without that."

Relational Technology's chairman is Belmont, Calif.-based Oracle Corp., one of the most successful technology stocks of the past two years.

Something else the people at Relational Technology will be happy to live without, Newton said, is the office of meetings and paperwork that rises from a contemplated public offering.

"This has been very time-consuming, and we have other things that we want to get on with," Newton said. Among these is the firm's campaign to reposition itself as a marketing-oriented, rather than exclusively technology-driven, business.

"After all," Newton said wryly, "this is the company that started out saying that all we had to do was have the finest technology, and the world would beat a path to our door. We've finally noticed that it doesn't work quite that way."

Now that Relational Technology is poised "to tool our own horns a little," Newton added, "we want to get on with it."

The offering will consist of 1.8 million shares of common stock; 1.5 million shares of company-issued stock, with the remaining 300,000 shares offered by shareholders.



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# COMPUTER CAREERS

## OS programming gets complex

*And now employers expect systems programmers to be personable too*

BY KATH GURLEY  
SPECIAL TO CW

**Desperately seeking systems programmer for 300-person MIS shop in Fortune 1,000 banking firm near New York City.** If you have a minimum of two years' experience with MVS and networking, know assembly language, are a creative problem solver and relate well to people, we want you. Knowledge of DEC VAX a plus. Undergraduate degree preferred. Salary \$33,000-\$37,000. Excellent opportunity for growth.

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That's the assessment of headhunters, market researchers, MIS directors and systems programmers of the marketability of systems programmers today. MIS departments are scouring the country for these experts and paying them well.

"This is an area that has always had demand," says Edward

Perlin, president of compensation consultants Edward Berlin Associates, Inc. in New York. "I've never seen a point where there is an oversupply. Usually, there is a shortage."

Recruiters say the most important entries on systems programmers' resumes are knowledge of assembly language and operating systems from IBM or Digital Equipment Corp. and two or more years' experience.

### Experience required

Entry-level people are not in great demand. Most systems programmers come from operations or applications programming and go through a kind of apprenticeship before they move over to systems.

Today, systems programmers usually monitor the network and operating system, help maintain system software, act as vendor liaison, program utilities, troubleshoot system glitches and manipulate the operating system to boost processing or storage capacity.

Perlin estimates that MIS departments need one systems support programmer for every 20 applications developers. Howard Levin, director of recruiter RSVP Services in Cherry Hill, N.J., says he places one systems programmer for every 30 developers.

Even though demand for systems programmers is strong, companies are increasingly selective. Forced to pay top salaries because of the scarcity of qualified people, they will search

programmers difficult.

"I look for the person who is logically oriented and who is a good problem solver," Wolfe says. "I would expect the person to know the lower level languages, like assembly. I also expect them to communicate well with people and to produce good documentation. If they are going to create a utility for someone else to use, then they are going

were not expected to be particularly personable. But MIS directors want to move more systems people into management, where communication skills are crucial, recruiters say.

Levin says technical requirements also have changed with the evolution of technology. In the last 10 years, while operating systems have become more complex, they have also become easier to maintain, he says.

**The age of specialization**  
Systems programmers once did both programming and maintenance. Now, those areas are specialties within systems programming. The change is because of an increase in the number and variety of operating systems, Levin says.

In another change, companies now prefer candidates who understand networking and Unix, although mastery of them is not usually required. In the future, however, companies may require systems programmers to be well-versed in a variety of operating systems, according to Brian Leahy, senior recruiter for Management Dimensions, Inc. in Wellesley, Mass.

With such specific experience sought, an undergraduate degree in computer science or business is not always required. However, Leahy says that having one may be a handicap when applying for management positions down the road.

Gurley is a free-lance writer based in Wellesley, Mass.

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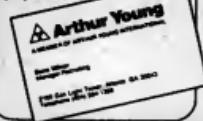


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# MARKETPLACE

## Virus scare infects clone sales

*Wary users guard against bugs with doses of IBM, Apple, Compaq*

BY CAMERON HALL  
BOSTON COMPUTER EXCHANGE CORP.

It is spring flu season, and computers are catching the virus. Tiny bugs seem to be creeping into everyone's systems, and the little critters are wreaking havoc with buyers.

Whether the software bugs are really there or are just a reasonable fear is not clear, but buyers are expressing new concern about close software and hardware. One wary consumer stated: "There's no way I'd buy something that might have AIDS in it."

Buyers saw the virus scare as just one more reason for sticking with tried-and-true brands, specifically IBM, Apple Computer, Inc., and Compaq Computer Corp.

Even though real viruses may be scarce, buyers reported real fears that software copies and off-brand equipment may harbor a surprise. Close demand was off during the week as buyers turned their backs on unknown brands and made purchases from companies they know well.

### Apple's quiet

The week ended April 8 was relatively quiet on the Big Board, with volume deals slowing somewhat and single units trading at stable prices. While the brokers

retrenched for the next few days of income tax deadline frenzy, price of major makers' hardware settled down from the gyrations of late winter.

On the IBM trading floor, most models traded at stable prices, with the exception of the IBM Personal Computer XT Model 086, which lost popularity like a presidential candidate with one delegate. The XT Model 086, a 10-MHz system, was down last week and continued to decline to close off \$25 at \$1,225, with a new low of \$950 during midweek trading.

The PC AT Model 339 was the clear frontrunner in this race, as it climbed \$15 over the previous week's figures. The availability of the AT Model 339 in the market is bringing more eager buyers in, increasing demand and causing the numbers to jump.

### Mac deflated

Some people used to call Apple's Macintosh 512 the Fat Mac, but during the week ended April 8, it might as well have been called the Flat Mac. Buyers and sellers met at last week's price of \$450 and \$450 in flat trading, with fewer willing to sell at the new low to which Macintoshes have fallen in the past few weeks.

The Macintosh Plus, up from last week's low, rose \$50 to

\$1,175 but was still under continuing pressure from new retail discounting.

A doleful of Macintosh Pluses also left willing buyers waiting for a Mac with greater value per dollar at those prices. Macintosh SE floppy- and hard-drive models both experienced increased demand and higher prices during the past week.

Compaq trading was generally down during the beginning of April, and the bottom seems to be falling out of the Compaq Portable Plus, which traded at a low of \$800.

The Plus, which is the venerable lugabug — the first machine with a real hard disk — is losing its value in most buyers' eyes. It seems to be time to sell the Compaq machine, before it becomes the donation item of choice.

### Think charity

Tax season always makes people think about deductions, and bargain hunters this year are still searching for new wrinkles on the IRS rules.

Even though they will not see the green of the deduction until next year, showed sellers in the market are thinking about tax consequences, and they are discovering their personal computers can turn into tax deductions, simply by donating the machines

### The BoCoEx Index

Closing prices report for the week ending April 8, 1988

IBM PC Model 076	\$800	\$900	\$600
XT Model 086	\$1,225	\$1,350	\$950
XT Model 088	\$1,475	\$1,700	\$1,175
AT Model 089	\$2,400	\$2,450	\$1,750
AT Model 339	\$2,750	\$2,750	\$2,300
AT Model 339	\$3,665	\$3,850	\$2,800
PS/2 Model 80	\$2,550	\$2,655	\$2,450

Apple Macintosh 512	\$450	\$750	\$400
512E	\$450	\$1,075	\$725
Plus	\$1,175	\$1,450	\$950
SE	\$1,925	\$2,300	\$1,800
SE 20 MHz	\$2,400	\$2,400	\$2,100
II	\$3,800	\$4,300	\$3,250

LaserJet II Model D	\$4,000	\$4,000	\$2,500
LaserJet II Model D	\$425	\$425	\$400
Apple Laserwriter Plus	\$8,100	\$8,300	\$3,500
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INFORMATION PROVIDED BY THE BOSTON COMPUTER EXCHANGE CORP.

to the handicapped.

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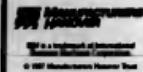
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Roger Fraumann  
Staff Director  
Lachman Associates, Inc.  
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**R**oger Fraumann is Staff Director for Lachman Associates, Inc. (LAI) of Westmont, Illinois. It is one of the largest privately held computer systems software consulting and development firms in the United States. And Roger is pleased to report that plans call for continuing the 50% annual growth every year for the next five years.

Roger is also pleased with Computerworld's contributions to the company's growth. When he needs qualified people to fill positions as the company grows, he turns to Computerworld.

"Computerworld is the only national publication that we routinely advertise in," says Roger. "Last year we determined that we needed consistent national exposure. We chose Computerworld, which gave us exactly that. Simply put, Computerworld delivers just what we're looking for: top-quality job applicants."

"We get about 20 responses per ad, and what really counts is that those responses yield at least two quality applicants per ad," Roger explains. "Overall, a higher percentage of quality people respond to our ads in Computerworld, as opposed to what other publications deliver. Computerworld works for us."

Plus, Roger has found added incentive to advertise in Computerworld: "The same ad that runs nationally in Computerworld costs twice as much to run in the Chicago Tribune, a local newspaper," he notes.

Since LAI began advertising in Computerworld, the company has gone from 50 to 130 full-time professionals. "We've been in Computerworld about every other week. And with the company's plans for growth for the next five years, we're going to continue advertising in Computerworld," says Roger.

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**George Bush**

**Advisors:** Dean Burch, director general of Intellect and former FCC chairman (1969-1974); Charles W. Greenleaf Jr., the vice-president's domestic policy aide.

**Technology:** Favours strengthening intellectual property protection to encourage innovation. Supports closer relationships among business, government and academia to move scientific advances to the marketplace.

**Taxes:** Favours making the R&D tax credit permanent and cutting the capital gains tax rate to 15% on investments held for at least one year.

**Trade:** Opposes mandatory reduction in trade imbalances (the Gephardt amendment).

**Telecommunications:** Generally supports deregulation and competition, although adviser Burch also emphasizes the need to enforce existing laws and regulations.

**Other:** Advocates requiring high school students to be computer literate before graduation.

**Supporters:** Political action committee contributions from Ameritech (\$5,000), AT&T (\$3,000), Computer Dealers and Lessors Association (\$1,000), GTE Southwest (\$1,000), NCR Corp. (\$1,000), Nynex Corp. (\$5,000), Pacific Telesis Group (\$140), Recognition Equipment Inc. (\$500), Southern Bell Telephone and Telegraph Co. (\$4,000) and Southwestern Bell Corp. (\$3,000).

**Michael S. Dukakis**

**Advisors:** U.S. Rep. Edward J. Markey (D-Mass.), chairman of the House telecommunications subcommittee; Larry Summers and Robert Reich, Harvard University professors.

**Technology:** Supports federal funding for the Sematech semiconductor consortium and similar ventures if federal funding is matched by the private sector. Would create a national network of Centers of Excellence for new and applied technology.

**Taxes:** Supports making the R&D tax credit permanent.

**Trade:** Opposes mandatory reduction in trade imbalances (Gephardt amendment) but supports a measure that imposes tougher sanctions on countries with unfair trade practices.

**Telecommunications:** Would provide temporary relief to troubled industries if they make investments in modernization.

**Telecommunications:** Likely to pro-regulation.

**Other:** Favours use of computer-based learning technologies to combat illiteracy. Supports advance notice of plant closings.

**Supporters:** Joe Henson, chief executive officer of Prime Computer, Inc.; An Wang, CEO of Wang Laboratories, Inc.; Mitch Kapor, founder of Lotus Development Corp. and current chairman of Go Corp.; and Patrick J. McGovern, chairman of International Data Corp.

Dukakis does not accept political action committee contributions.

**Albert Gore Jr.**

**Advisors:** Peter S. Knight and Roy Neel, Senate aides.

**Technology:** Federal government should support and collaborate with private-sector R&D efforts and increase private sector's access to federal labs.

**Taxes:** Cosponsored legislation to raise the R&D tax credit to 25% and make it permanent.

**Trade:** Opposes mandatory reduction in trade imbalances (Gephardt amendment). Supports legislation to provide temporary relief to industries hit-hard by foreign imports.

**Telecommunications:** Sponsored bill to allow regional Bell holding companies to diversify into all fields, subject to FCC approval and regulation. Skeptical of FCC proposal to replace traditional rate-of-return regulation.

**Other:** Supports creating an Office of Critical Trends Analysis to help the president analyze technological trends. Cosponsored legislation to require advance notice of plant closings.

**Supporters:** Political action committee contributions from AT&T (\$2,500), BellSouth Corp. (\$3,000), Communications Satellite Corp. (\$500), Competitive Telecommunications Association (\$500), Computer Dealers and Lessors Association (\$1,000), National Venture Capital Association (\$1,000), Pacific Telesis Group (\$1,500), Service Employees International Union (\$5,000) and South Central Telephone Co. (\$1,000).

**Jeane L. Jackson**

**Advisors:** Benjamin Hooks, former AFL-CIO executive; Carol O'Clairacain, labor economist; and Mark Steitz, economic policy adviser.

**Technology:** "My administration would shift the incentives from corporations merging and purging jobs to reinvestment in America, retraining workers and research and development for commercial use . . . Science and technology are essential for restoring competitiveness."

**Taxes:** Raise corporate taxes by \$20 billion.

**Trade:** Generally opposes mandatory reduction in trade imbalances in principle, but would support such a measure because, he says, President Reagan "haven't been vigilant enough on trade."

**Telecommunications:** Believes the industry is not competitive and must be strictly regulated.

**Other:** Supports advance notice of plant closings.

**Supporters:** Political action committee contribution from Service Employees International Union (\$5,000).

**Profile:** were compiled from interviews with campaign aides, candidates' literature, Federal Election Commission records, research by Alan Peacock of Information Age Economics, Inc. in Bethesda, Md., and a study by the Council on Competitiveness. Information was selected for relevance to the computer industry.

**Campaign**

FROM PAGE 1

search and development permanent. The 20% credit is slated to expire at the end of this year.

• Each Democrat says he believes that too much scientific talent and money is directed toward the military and should be redirected toward the commercial market.

• Bush emphasizes his support of stronger protection of intellectual property rights at home and abroad, to foster innovation.

• Jackson stresses the need to stop manufacturers from pulling up roots and setting up shop in countries where wages and other labor conditions are far below U.S. standards.

• Bush, Dukakis and Gore oppose mandatory retaliation against countries that maintain trade imbalances due to unfair

trading practices — the trade bill amendment sponsored by Rep. Richard Gephardt (D-Mo.). Dukakis supports stronger sanctions against unfair trading, and Jackson reluctantly supports the Gephardt amendment.

• All of the candidates support an increased effort to attain computer literacy, retraining programs for displaced workers and increased federal funds to improve research facilities at universities.

• Dukakis has been endorsed by top executives at Prime Computer, Inc. and Wang Laboratories, Inc.; Bush's financial backers include NCR Corp., Nynex Corp. and American; and Gore has received money from BellSouth Corp. and the National Venture Capital Association.

Although the exact details of their programs vary, the candidates' attention to high-tech issues is a welcome surprise to

many industry insiders.

Charlotte LeGates, spokeswoman for the Computer and Business Equipment Manufacturers Association (CBEMA), praised the attention the men have been lavishing on high-tech and competitiveness issues, particularly the R&D tax credit.

Computer industry officials such as Samuel H. Fuller, vice-president of research and architecture at Digital Equipment Corp., said the tax credit gives companies an extra incentive to pump some of their funds into R&D ventures that will produce the next generation of computer systems.

**Contradictions**

LeGates, however, expressed concern that some candidates have positions that, when viewed from the computer industry's perspective, are contradictory. For example, she said,

Jackson's plan to raise corporate taxes by \$20 billion directly conflicts with his support for high-tech industries. "You can't say that technology is important for competitiveness and then just take all of the money you're supposed to invest," she said.

CBEMA plans to provide the party nominees and the presidential transition team with a document describing how the computer industry works and the effects tax and trade policies have on it, LeGates said.

Despite all the talk about competitiveness, Milton R. Wessel, a computer law professor at Georgetown University in Washington, D.C., said the candidates are still failing to address what he called the key question of information age policy: "How can society deal with technology that is moving faster than our institutions can accommodate?"

Wessel, the special counsel

for ADAPSO, a computer software and services industry association, noted that ADAPSO has pushed for an information age commission to explore issues such as the effects of computer networks on the economy and individual privacy.

**Competitive Gore**  
Lugging around his Zenith Data Systems Z-181 laptop, Gore represents a new generation of candidates who are comfortable with technology.

Whether hunkered down in a car on the way to a speech or in his hotel room at night, Gore uses his ever-present laptop to tap out messages and revise policy drafts with his campaign headquarters staff.

"Of all the candidates, I think Gore probably knows the most about technology issues," said Robert Adams, a policy science

Continued on page 137

# Campaign

FROM PAGE 136

consultant in Arlington, Va., and spokesman for the Association for Science, Technology and Innovation.

Adams noted that Gore has served on the telecommunications and science and technology subcommittees and has been a member of the Congressional Clearinghouse on the Future.

Gore's interest in future technologies was demonstrated in 1985, when he sponsored a bill to create a future-oriented Office of Critical Trends Analysis in the White House to help the president analyze technological trends.

In addition, the senator sponsored a bill in 1986 describing in great detail how the Federal Communications Commission should regulate AT&T and the regional Bell holding companies.

But Gore is not the only candidate drawing on his high-tech background. Massachusetts Gov. Dukakis wears the high-tech business that encircles Boston like a chip-layer's crown. Since the early days of his campaign, Dukakis has touted his state's low unemployment rate and his ability to attract high-tech business to previously crumbling mill towns as "The Massachusetts Miracle."

His claim, however, has met with anything but universal agreement. "We don't believe in miracles," retorted Howard Foley, president of the Massachusetts High Technology Council. "A lot of the things people see when they talk about the Massachusetts success story are the results of things the governor originally opposed. And some of the things he supported — an increased tax on capital gains, a tax on custom computer software — we successfully fought against. Yet the governor has been a significant part of our fight."

## A matter of location

Others argued that Dukakis has reaped the political benefits of many a chief executive officer's decision to locate his company

near the intellectual breeding ground of MIT, Harvard University and the dozens of other colleges and universities in and around Boston.

But Interleaf, Inc. President David Boucher supported the governor's claim, remembering the early days of his now-successful software company, when the Dakakis-sponsored Massachusetts Technology Development Corp. (MTDC) stepped in to buy stock in the fledgling firm. "The growth in the Massachusetts economy has been largely built on the computer industry," Boucher said. "Setting up MTDC was an example of Dakakis's understanding that new technologies can generate significant economic growth but [that] you need to create an infrastructure to help that happen."

Dukakis has also been hanging his political hat on taming the merger and acquisition lion currently swallowing up smaller businesses. "We've got to get control of the merger and acquisition binges that's gobbling up capital, tearing corporations apart like erector sets, making millions for a few and leaving the average working man and woman holding the bag," he said during a recent speech in Milwaukee.

Vice-President Bush has made friends in the industry by vowing to fight the piracy of intellectual property, such as software copyrights. "That's a continuation of the strong emphasis the Reagan administration has put on intellectual property protection. And I strongly suspect that the others would be equally supportive," CBEMA's LeGates said.

Bush calls technology "America's fountain of youth," opposes protectionist trade measures and says he wants to be known as the "education president." He also supports a cut in the capital-gains tax that would benefit small high-tech companies that depend on venture capital.

Jackson is riding the crest of his wave of worker support to stress labor issues. He has emphasized the need to help empha-

sizes workers and communities that are hurt when U.S. factories are closed. "American multinationals, classic short-run profits and concerned with quarterly statements, have taken American jobs to low-wage labor markets abroad," Jackson says.

Jackson also stresses the importance of education; he proposes doubling the federal education budget. "There needs to be an emphasis on basic skills — from reading literacy to computer literacy — that will prepare our children for the world of work as it exists now and as it will exist in the future," he says.

But CBEMA is troubled by some of Jackson's "populist rhetoric," CBEMA's LeGates said. U.S. firms move jobs abroad only when there are sound economic reasons for doing so, she said, and U.S. companies need foreign offices to help export products, stay competitive and preserve jobs.

## Judges by his advisors

One way to gauge the presidential candidates is to identify their technical advisors, according to Alan Pearce, president of Information Age Economics, Inc., a Bethesda, Md.-based research and consulting firm.

Dukakis, for example, gets his telecommunications advice from Rep. Edward J. Markey (D-Mass.), the pre-regulation chairman of the House Telecommunications Committee. Bush often lends an ear to Dean Burch, who was chairman of the FCC during the Nixon administration.

Pearce, who worked at the FCC under Burch, predicted that a Bush administration would not push deregulation as hard as the Reagan administration has. Burch was a vigorous regulator of the prederegulatory Bell system and had said he believes in upholding the existing law and regulations until Congress defines a new regulatory structure.

"Although Bush is supposed to be a clone of Reagan, he may turn out to be more pro-regulation than many of his supporters would believe," Pearce said. If that is true, deregulation of the communications industry may come to a halt no matter which candidate wins the White House job in November.

## Defining the issues

**A**s the presidential hopefuls set the national political agenda in ringing oratory delivered to crowded halls across the country, Computerworld afforded some of the leaders of the computer industry's key organizations a similar opportunity. The question: "What are the computer-related issues that should be addressed this election year?"



**John Pickitt**, president of the Computer and Business Equipment Manufacturers Association

Some candidates are attacking companies for obtaining parts outside the U.S. and incorporating them into products sold in the U.S. But we must be able to buy the best products at the lowest prices, no matter where we find them. To cut ourselves off from global sourcing would dramatically slow today's information technology industry.

We also need to emphasize the quality of education, especially in the challenging areas of science, math and engineering.

**Steve Adamson**, international president of the Association for Systems Management

If we get control of the deficit, the foreign trade imbalance and merger mania, our MIS managers may still have their jobs. If we don't, a significant number of them probably will be laid off because they find themselves superfluous in a merged organization or the country in the throes of a recession.

We should also stop graduating illiterates from high school. The cost of a lost education not only affects our global competitiveness but hits internal budgets through the amount of time required for job training.



**John Imley**, chairman of the board and chief executive officer of Management Science America, Inc.

Free trade is right at the top of my list. An unrestricted trade policy is vitally important to the future of the software industry. I'd also like to see the protection of intellectual property rights and continued efforts against software piracy. Finally, there needs to be a stimulation of new U.S. businesses in the software industry by the continuation of the R&D tax credit.

**Christian Meyer**, president and chairman of the Data Processing Management Association

I'd like to see the healthy free-market operation of the computer industry continue, but I'm also concerned about competition from abroad. We're handicapped by the benefits given some of our foreign competitors. We need at least a moderately level playing field for American firms to compete effectively; right now, it resembles a mountainous terrain.



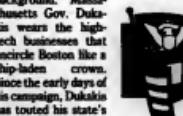
**George DeBakey**, executive director of ADAPSO

We don't want to see a protectionist trade policy, which could backfire if countries in turn close their borders. We would also like to see our government working with foreign governments to stop software piracy, here and abroad, through the improvement of copyright, patent and trademark laws.

We'd also like to see the government buy software and services off the shelf, rather than internally create their own. And we'd like to see a computer education bill whereby federal funds are earmarked for the increased acquisition of computers in schools, especially in financially deprived areas.

**Paul Berger**, president of the Society for Information Management

We need to establish severe penalties to protect company data bases from hackers and people who specialize in industrial espionage. We also ought to encourage the free flow of technology across borders. Finally, we need to pay close attention to health issues, like the potential dangers from lengthy exposure to CRTs.



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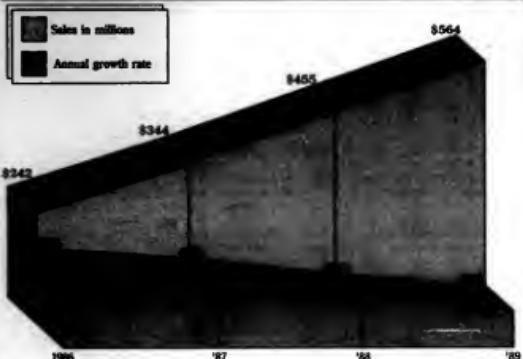
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## TRENDS

## High-end communications

T1 forecast: Growth slows, but long-distance nets stay strong



**W**hile the T1 switch market seems to be consolidating around a few major players, the industry should still benefit from an infusion of new blood and technology as computer companies, carriers and other vendors seek their share of the expanding private networking pie.

Users should see better integration of T1 and computer networking systems through IBM's technology transfer agreement with Network Equipment Technologies, Inc., and Unisys Corp.'s recent acquisition of Timplex, Inc.

Hewlett-Packard Co. is likely to ally with either Digital Communications Associates, Inc. or Stratacom, Inc. by this fall, according to Salomon Brothers, Inc. Digital Equipment Corp. also seeks allies, but it, too, is likely to connect with a range of T1 products.

Network switch vendors, computer firms and carriers are beginning to lock horns over the issue of who will manage customers' networks — an issue that has direct bearing on who will supply customers' networking equipment.

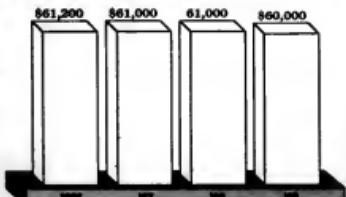
Carriers will offer network management as a lure to bring private T1 network users back to their own services.

Salomon Brothers estimates that approximately 35% of the Fortune 1,000 corporations will continue to use T1 network services.

ELISABETH HORWITZ

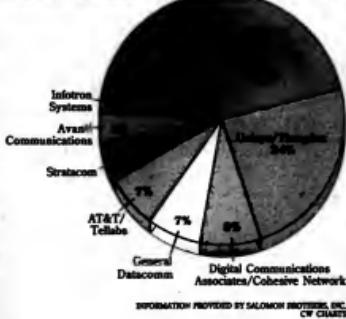
## Equipment costs not falling much

COST PER BASIC SWITCH UNIT



## Many vendors slice up \$155M market

WORLDWIDE MARKET SHARE



## INSIDE LINES

Bridge requires in progress. In a tribute to the power of user muscle, 3Com announced last week a joint development agreement with archrival Novell. The deal will allow Novell's Netware to run on 3Com's new Ethernet adapter cards, which are supported on IBM's Micro Channel architecture. One source said Novell might be having problems developing its own Micro Channel adapters. Insiders at 3Com said the agreement was spurred by company President Bill Carrico, who has stressed that the firm should concentrate on strategies that sell products rather than build on past grudges.

Creaky barriers. The New York Stock Exchange is discussing more curbs on computerized stock trading in hopes of preventing another stock market crash. Now, the NYSE is considering a ban on the use of its automated order system for all forms of program trading — particularly the hedging strategy of portfolio insurance — on days when the Dow Jones industrial average moves more than 150 points. The NYSE already has a voluntary limit on one form of program trading, called index arbitrage, when the Dow moves more than 50 points.

A word from the Wyse. Wyse Technology President Phil White said his company's version of IBM's OS/2 is at beta test sites and will begin shipping soon. In other yet-to-be-seen talk, White said Wyse is developing an IBM Personal System/3-compatible computer that might ship later this year and will ship in volume in 1989. The company is also planning to introduce PS/2 add-in boards next year.

Better than nothing — we guess. Floating Point Systems has agreed to acquire what's left of Celentra Computer, paying Celentra's shareholders with \$1.25 million worth of Floating Point stock. Floating Point, which has been treadng water with a loss of \$35 million in the last five quarters, said it will take on support of Celentra's 100 customers.

No hard look-and-feel violations. Even as it releases Apple's lawsuit over alleged look-and-feel violations, Microsoft is still asserting its love for the Macintosh. Microsoft has just committed to upgrading all of its Mac applications this year, despite its war of words — and lawyers — with Apple.

Looking back over the dancin' card. Encus had at one point discussed a merger with Network Equipment Technologies rival and frustrated suitor Digital Communications Associates (DCA). "But we have in place a channel of distribution geared to the high end of the market that Encus (and DCA) don't reach," said NET President Bruce Smith, adding that cultural similarities and geographic proximity helped cement NET's relationship with Encus. DCA, which is not above attempting hostile takeovers, should take note: A personal touch counts.

Buy them by the dozen. Dell Computer is set to become the first PC maker to announce an IBM Micro Channel architecture-compatible system today. Two PS/2 clones are slated for introduction, though the firm wouldn't reveal when the machines will ship. Dell will also unveil a series of aggressively priced systems today, highlighted by the System 310, a 20-MHz Intel 80386-based machine with an IBM Video Graphics Array (VGA) monitor and 40MB bytes of memory that is priced at \$4,000. The company is also scheduled to roll out the System 220, a 20-MHz Intel 80286-based system with a VGA color monitor and 40MB bytes of memory priced at \$2,799, as well as the System 100, a 9.5-MHz Intel 80386-based system with a VGA color monitor and a single 3½-in. floppy drive priced at \$1,199.

Big secret. IBM is expected to make a major DB2 announcement tomorrow — sooner than anticipated in many quarters of the industry. Top IBM spokesmen have made themselves available to comment on DB2's direction in the last few days, and an IBM public relations figure declined to deny the announcement is coming April 19.

Don't let another presidential primary go by without sharing a news tip. Call News Editor Pete Bartelski at 800-343-6474 (in Massachusetts, dial 617-579-0700).

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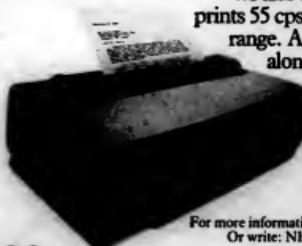
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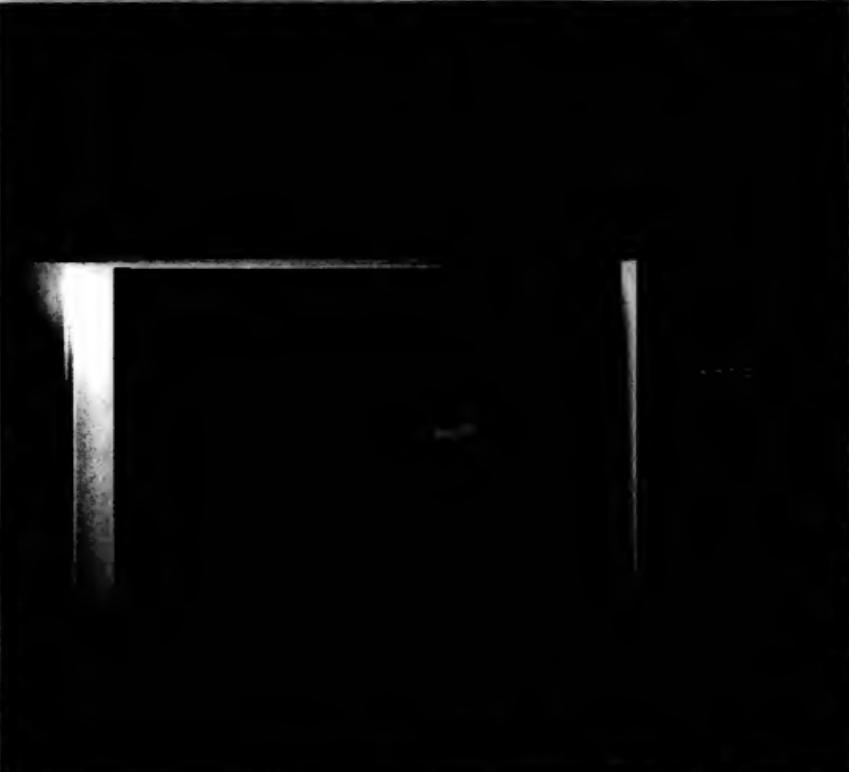
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Measurex Corporation is a leading manufacturer of sophisticated process control systems. In fact, today it is well on its way to revolutionizing the process manufacturing industry—with the introduction of its VISION 2000™ Network, the first true, computer-integrated manufacturing (CIM) control system with plant-wide capabilities.

The introduction of CIM technology, though, is only one measure of the Measurex success story. Measurex has also been extremely successful at managing its own internal operation by gaining more control over its inventory. But in order to accomplish this, Measurex first had to seek new software technology to reconcile the differences between its two incompatible databases—one for financial reporting and one for production.

After careful review of several software vendors, Measurex turned to Management Science America, Inc., for the solution. We showed them integrated manufacturing and financial software, making it possible for every department to work from the same information. This resulted in greater control over inventory and the elimination of costly write-offs.

Jerry Reffet, Senior Vice President, Operations for Measurex, put it this way: "By the way it's integrated, MSA Software helps us realize that we're all one company. Everyone—people in accounting, purchasing, production and finance—now has the same perspective, the same visibility, to see what's taking place in manufacturing."

We can help you size up your company's performance more accurately, too. For more information, call Robert Carpenter at (404) 939-8000.

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